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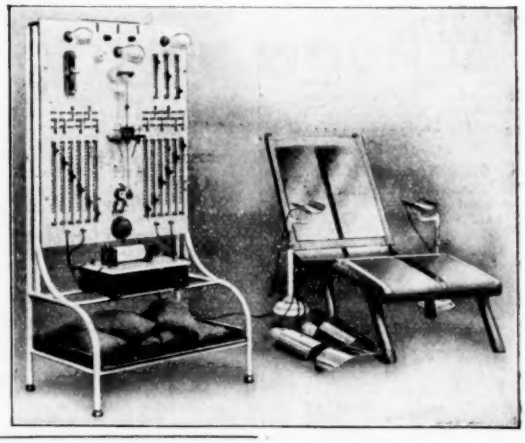

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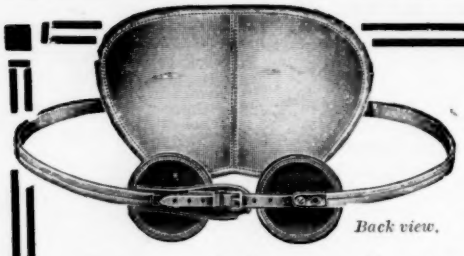

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A Review

OF THE

WORK DONE BY THE GLASGOW SCHOOL ON THE ÆTIOLOGY OF RICKETS.

Introductory Lecture to Post-Graduate Course, Manchester Babies' Hospital, Feb. 18th, 1922,

BY LEONARD FINDLAY, M.D., D.SC. GLASG.,

LECTURER ON MEDICAL DISEASES OF CHILDREN, GLASGOW UNIVERSITY: VISITING PHYSICIAN, ROYAL HOSPITAL FOR SICK CHILDREN, GLASGOW.

THE subject of rickets is so large and has such an enormous literature, which is growing daily, that it was somewhat difficult to know where to begin. I ultimately decided that our several interests would probably be best served by recording the story of the rickets problem as I have seen it unfolded in Glasgow. A very personal element will thus naturally be obtruded, from which I trust the subject-matter will gain in interest what it will lose in comprehensiveness.

There are at present two main schools of thought regarding the ætiology of rickets—one with its stronghold in Cambridge, teaching that the disease is dietetic in origin, and the other, to which I belong, believing that defective hygiene, using this term in its widest sense, is the most important known determining factor in the causation of rickets.

THE FACTORS OF CONFINEMENT AND LACK OF EXERCISE.

I commenced my experimental work on rickets in 1906. For many years previously fitful experimental work on the subject had been done in Germany. My interest had been aroused in the anæmias of infancy, especially that type going under the name of von Jaksch's anæmia. It was taught in these days that rickets was an important predisposing or ætiological factor in this syndrome (von Jaksch's anæmia), but my own researches were definitely opposed to any such idea. As rickets is so liable to be complicated by catarrhal conditions, which might of themselves influence the blood picture, I determined to attempt to follow the blood changes from the inception of the disease experimentally induced. I was familiar with the usual text-book story of Bland-Sutton's experiences in the London Zoological Gardens; in those days I was a believer, looking upon the ætiology of rickets as settled. All the teachers of pædiatrics whom I held in esteem said that it was a dietetic disease, due to a deficiency of fat with possibly an associated excessive amount of carbohydrate; they had apparently anticipated the epoch-making discoveries of the vitamin school. However, I wrote to Bland-Sutton and asked him what was the best diet with which to induce rickets in puppies, and I received the reply, "Rickets is easily produced in young animals if they never obtain milk, no matter the diet." I accordingly commenced by feeding my experimental animals on bread and water, rice and water, and oatmeal and water. They, however, just as in the similar experiments carried out by Baxter about 1881,[1] did not develop rickets but marasmus, whereas the control animals fed on milk and oatmeal porridge all became rachitic. Of these controls, one animal, which was ultimately intended to be the pet of a friend and had been exercised in the open, presented the least severe manifestations of the disease. This naturally directed one's attention to lack of exercise. This animal was allowed, for a matter of a week, still more exercise, and all appearances of rickets practically vanished; on once more confining him with the others he again became affected. In order to further test this hypothesis two sets of experiments were carried out. The confined animals and the controls were of the one litter, and were fed on the same diet of whole milk and porridge with occasional boiled horse-flesh. They were all housed in the same room; some were confined in a cage, whereas the others were allowed their freedom and on occasions taken out for walks. The confined animals became markedly rachitic, while those allowed their freedom did not.

On the strength of these experiments, and also of clinical histories in cases of rickets, I formulated the hypothesis that rickets is due to confinement and lack of exercise. My results were published in 1908,[2] and I suggested that, through improved general hygiene, just as typhus had ceased to be a scourge, so might rickets disappear. At this time I was unaware of Hansemann's paper, published in 1906,[3] in which he states that the cause could be written down as domestication, using this term in its widest sense. Hansemann usually gets the credit of being the first to suggest domestication as the cause of rickets, but it would seem that he had been forestalled by a Frenchman, Ferdinand Lataste.[4] Lataste attempted to rear some rodents obtained in Algeria, but found that in captivity they all developed a disease of the bones which developed earlier the longer they had been in confinement, and which he ascribed to "domestikation." Hansemann came to his conclusion from a consideration of the disease as it occurs spontaneously in man and animals, and also as induced experimentally. Rickets was at that time supposed to be unknown in Japan; Hansemann therefore induced one of his former Japanese students to capture a young wild monkey and to confine it in a cage. After curvature of the bones had developed the animal was sent to Hansemann in Berlin; histological examination of the bones revealed, in Hansemann's opinion, a picture identical with that seen in human rickets. The first known example of rickets occurred in an ape which had been confined in a Theban temple some 2000 years B.C.[5]

Spontaneous Rickets in Puppies, Apparently due to Lack of Exercise.

Shortly after the completion of my experimental work I became acquainted with the occurrence of spontaneous rickets in animals kept by friends, and these may at this juncture be opportunely referred to. The one instance came under the notice of a farmer on the West Coast of Ireland, and I cannot do better than quote his own words from a letter which he sent me.

> "I have learned of a case of rickets in a pup about which I am sure you would like to hear. This pup was fed on a perfect food, new milk, but from the very start was confined in the bottom of a barrel, where it was quite impossible it could exercise itself. One swallow does not, of course, make a summer, and one case of the kind does not prove that rickets is caused by want of exercise, but in the light of your investigation, and the great rarity of this disease in the West of Ireland (I never having seen a case of rickets in the West of Ireland in man or beast) it has weight."

The other example was recorded by Dr. John Fergus, of Glasgow, in the course of the discussion following the reading of my original paper to the Medico-Chirurgical Society of Glasgow. He told how during the previous summer his son and niece each had a fox terrier pup of the same breed and of about the same age. His son was able to run about with his pup and thus it obtained plenty of exercise, but his niece, who was unable to do this, had her favourite tethered to a garden seat in order that she might always have it by her. Both animals were fed exactly alike so far as could be ascertained, and the only difference in their treatment seemed to be in the amount of exercise allowed. By the end of the summer the boy's dog was a fine healthy animal, whereas the girl's dog had become so deformed, from what Dr. Fergus described as rachitic curvatures of the bones, that it had to be destroyed.

Dietetic and Housing Conditions of Rachitic and Non-Rachitic Infants.

These various facts tended to confirm me in the opinion that rickets was not of dietetic origin, but consequent on confinement. To give numerical precision to my statements I extended my clinical

inquiries and collected statistical information regarding the dietetic and housing conditions of rachitic children. During a period of two to three years I collected at my out-patient clinic facts in 500 cases of rickets regarding the length of time the child was at the breast, the age at which extra feeding was commenced, the size of the house and number of inmates per room, and the amount of time the child spent in the open air. Excepting that an attempt was made to deal with the disease in the active stage, and consequently only the youngest children were chosen, the cases were not specially selected; each day a certain number of those with apparently active rickets first presenting themselves for treatment were set apart for investigation. In this way I believed that I was obtaining a fairly representative sample of the material. For comparison[6] of some of the points I obtained histories of some 500 healthy non-rachitic children. I found no real difference between the length of time that the rachitic and non-rachitic children were breast-fed. In the vast majority of the rachitic children there was no evidence of a gastro-intestinal disturbance prior to the onset of the malady. There did emerge, however, the fact that the number of cases increased with the diminution of air-space allowed per person; some 10 cases only were observed when there were three occupants of a two-apartment house, whereas when four or more persons occupied one room the number of cases totalled 260. It was also found that though 135 of the children were said to have been taken out regularly, the mothers admitted in 340 instances that the children had not been taken out at all, or at least only very occasionally. Though I concluded that these findings gave considerable support to the confinement and lack of exercise theory, and that these probably reacted through deficient aeration or oxygenation, I must admit that the results might equally well support an infectious origin. In this connexion cerebro-spinal fever is at once recalled to mind; this disease is now known to remain in abeyance till the supervention of a certain degree of overcrowding. Development of rachitic osseous changes while a child is resident in the well-ventilated ward of a hospital, a fact which I have observed, is, however, opposed to this analogy—hough, it must be admitted, such an occurrence might be explained by a very prolonged incubation period.

Rickets and the Thymus.

At about that time the researches of Klose and Vogt and of Matti were receiving considerable attention. At the annual meeting of the British Medical Association at Aberdeen in 1914, Sir A. E. Garrod accepted it as an established fact that rickets was due to hypothymusism. We were fortunate in having associated with us at the physiological department of Glasgow University Dr. Mill Renton, who had done some previous work on the effect of thymusectomy in the guinea-pig; he, along with Dr. Madge Robertson, repeated the work of Klose and Vogt but were unable to corroborate their findings.

In the paper[7] embodying their results the following were among the conclusions come to by Renton and Robertson: (1) Removal of the thymus does not make the animals more susceptible to spontaneous rickets; (2) removal of the thymus cannot be held responsible for the onset of rickets or similar bony changes, and the evidence we have obtained points to the changes which have been credited to the loss of the thymus really being due to the development of spontaneous rickets in young animals.

These conclusions were firmly supported by the later work of Park and McClure.[8]

Team Work: A Digression.

During the progress of the previously mentioned statistical inquiry published in 1915, Prof. Noël Paton and I had become collaborators. Much of my experimental work on rickets had been done in his laboratory, and we were engaged at the time on a clinical and experimental study of tetania parathyreopriva.[9] This co-partnership, which I particularly prize, has continued till the present time.

In this way the more or less academic aspect of disease has been brought into intimate association with the clinical, and vice versa, to the great benefit of both sets of workers, and—although I do not for one moment wish to magnify the importance of our researches, and appreciate as much as anyone their limitations—to the greater benefit of medical research than would have occurred had the two types of workers remained independent. A young physician or a young surgeon during his waiting period not uncommonly spends some time in a laboratory, but it is exceptional for the head of a physiological department and the head of a clinical department to become allied for serious and consecutive research. In my opinion the ideal would be to extend such a combine to include the chiefs of a pathological department and of a surgical department, so that as comprehensive an idea of vital phenomena as possible would be obtained. The usual conception of a medical unit and its potentialities does not stand comparison with such a league as above outlined. I do not, of course, suggest for one moment that such a combination is bound to result in epoch-making discoveries; the latter are only made by the man of vision—often alone and unaided, with the simplest and apparently unsuitable facilities—but I sincerely believe that were such alliances more general much discordant opinion on facts of everyday occurrence would disappear. Each member of the combine would benefit, and his department, as a result of the stimulation, be more productive. Personally, I have no hesitation in saying that much of the work emanating from my own department would not have been possible without such an alliance. It is also a privilege to be able to express our indebtedness to the Medical Research Council for the essential financial help in our various undertakings.

SOCIAL AND ECONOMIC FACTORS.

But to revert to rickets, Prof. Paton and I determined to extend the statistical inquiry into the social and economic factors in the lives of rachitic children. As I have previously mentioned, my own statistical study fell short in many respects, the chief being that in the case of some of the factors studied non-rachitic and rachitic children were not compared, and also that the diet of the children after the cessation of breast-feeding had not been investigated. Prof. Paton had already supervised a dietary study of the labouring classes in Edinburgh[10] and of the working classes in Glasgow,[11] and the intention was to repeat such a comprehensive dietary inquiry in known rachitic and non-rachitic families of the same social scale, and at the same time to pay attention to the housing conditions. We were happy in obtaining the services of Miss Margaret Ferguson, who had had some previous experience in social work at Queen Margaret's Settlement of Glasgow University. The study extended over a period of two years and embraced 350 rachitic and 200 non-rachitic families. The length of time the child was breast-fed, the position of the child in the family, the condition of the bowels previous to the onset of the disease, the amount of air-space in the house allowed per man, the number of stairs up that the house was situated, and whether or not the child had been much out of doors—all points previously investigated by myself—were again inquired into. The following considerations were added: (1) Parentage; (2) previous health; (3) (*a*) the diet of the child previous to the onset of rickets, and (*b*) the diet of the families; (4) size of family and condition of the other children; (5) family income; and (6) general character of the housing. The names and addresses of the rachitic and non-rachitic families were obtained from the outdoor department of the Royal Hospital for Sick Children, Glasgow. The houses were visited by Miss Ferguson, who recorded all the details, weighed the food daily for one week in each of the dietary studies, took a sample for examination, and collected all

waste for the correct estimation of the amount eaten. The results of this investigation were published in detail as a special M.R.C. report with a historical introduction by myself, and a concluding critical analysis of the results by Prof. Paton and myself.

Environmental Advantages of the Non-Rachitic.

From this study it was concluded that in environment, as evidenced by conditions of housing and parental care, there was the greatest difference between the rachitic and the non-rachitic families. The average air-space per person was, in the case of marked active rickets, 396 cub. ft., in the case of slight rickets, 452 cub. ft., and in that of the non-rachitic child, 565 cub. ft. So far as maternal care was concerned this could be described as good in only 46 per cent. of the rachitic but in 84·5 per cent. of the non-rachitic households. In this connexion it must be admitted that the rachitic families were 20 per cent. larger than the non-rachitic families, and the health of the mother was bad in nearly 30 per cent. of the rachitic (but in only 5 per cent. of the non-rachitic families), two factors which, while reacting on the amount of parental care, might probably at the same time mean less available food per individual. But diet did not seem to play any important part in the question. The average caloric intake per man was, in the rachitic families, 3315, with a minimum of 2223 and a maximum of 4702, and in the non-rachitic families 3390, with a minimum of 2311 and a maximum of 4588. In the case of the rachitic families 26 per cent. consumed less than 3000 calories per man per day, as against 25 per cent. in the case of the non-rachitic, while 33 per cent. of the rachitic and 45 per cent. of the non-rachitic families consumed more than 3500 calories per man per day.

So far as the individual proximate principals of the diet were concerned 52 per cent. of the rachitic and 60 per cent. of the non-rachitic families consumed more than 100 g. of protein per man per day, and 48 per cent. of the rachitic and 40 per cent. of the non-rachitic less than 100 g. per day, but in no instance, in either the rachitic or the non-rachitic families, was less than 80 g. per man per day taken. The average daily consumption of fat per man for the rachitic families was 87·3 g., with a minimum of 50·9 and a maximum of 124·5, and for the non-rachitic families 96·7 g., with a minimum of 52·4 and a maximum of 131·3 g. No correspondence between the amount of fat consumed and the severity of the rachitic manifestations was observed; 14 per cent. of the rachitic and 20 per cent. of the non-rachitic families consumed less than 70 g. of fat per man per day.

Nor did the family income seem to bear any relationship to the disease. 51·6 per cent. of the markedly rachitic and 37·5 of the non-rachitic families had a weekly income of 20*s.* to 30*s.*; 25·2 per cent. of the markedly rachitic and 31·5 per cent. of the non-rachitic families had a weekly income of between 30*s.* and 40*s.*; 14·8 per cent. of the rachitic and 26·5 per cent. of the non-rachitic families had weekly incomes of over 40*s.* Perhaps the best idea of the influence of the income is obtained from the amount expended per man per day on food and rent. The average daily cost of food per man in the rachitic families was 9¼*d.* and in the non-rachitic 10¾*d.*, while on rent the former spent 6½*d.* and the latter 7½*d.*

THE VITAMIN DEFICIENCY THEORY.

During the course of this research Mellanby[12] commenced his work and resuscitated the earlier teaching that rickets was due to deficiency of fat in the diet—except that in his opinion it was not from the absence of the fat qua fat but because there was, linked to it, an antirachitic vitamin, identical with or similarly distributed to fat-soluble A. Mellanby[13] stated that he could induce rickets in pups by feeding a diet of bread and milk (175 c.cm.) and that the disease could be prevented by the administration of butter, cod-liver oil, and most other fats tested. His preliminary notes, and the knowledge that at Cambridge work was proceeding which, it was said, contradicted the conclusions come to by the Glasgow school made us doubly critical of our findings.

We found it impossible to modify our conclusions; but to make assurance doubly sure we reverted to the problem once more. Of two litters of pups being used in a metabolic study, five were sent to the country and fed on a diet of porridge and skim milk, the daily intake of fat being certainly not more than 2·8 g.; these animals were properly exercised. The remaining pups of either litter were kept at home in the laboratory, fed on porridge and whole milk with in some cases the addition of butter, so that the daily intake commencing at 3 g. rose to 6 g., and with the addition of butter amounted to even 14·5 g. Of those in the laboratory, some were allowed to run about, and others were kept confined in cages. All the laboratory pups, on being killed at the age of 11 weeks, showed signs of rickets—one receiving butter being the most severely affected—whereas those brought up in the country remained absolutely normal.[14]

A still further set of experiments carried out by Paton and Watson[15] gave practically the same results. Of one litter two animals received 7·5 g. and 11·0 g. milk fat per day; a third, fed on separated milk, had only 0·8 g., and presented a most severe degree of rickets. Of the other litter three animals obtained 7·5, 3·0, and 0·8 g. of butter fat per day. On the whole, rachitic manifestations were severest in the animals fed on the separated milk. The only animal of the series which did not present rickets had, however, been fed on separated milk; another, with marked rickets at the age of 14 weeks, was given extra fat, so that it received 10 g. per day, yet when killed at the age of 19 weeks it showed an apparently extended rachitic condition. These experiments seemed unmistakably to justify the conclusion that whatever the cause of rickets deficiency of fat intake could not be blamed. In many of Mellanby's experiments animals of different litters had been employed and compared with one another, a most dangerous procedure to follow in view of the notorious varying susceptibility of different breeds of dogs to the disease. Mellanby,[16] in justifying such experimental conditions, waives this objection aside on the ground that it can only have a bearing on the hereditary aspect of the disease, a matter not of prime importance. I would here like to emphasise the fact that in all the experimental work done in Glasgow only animals from the same litter have been compared in any one test.

A critical survey of the dietaries in the last recorded set of experiments suggested that animals with the lowest caloric intake presented the most severe grade of the mischief, and further experiments were set going to test this deduction. Pups from three different litters were fed on different diets, diets of full cream, fresh milk, full cream dried milk, separated milk and separated dried milk plus lard—the caloric intake being made more or less alike by the addition of bread, and during the experiment kept constant per kilo body-weight by increasing the amount of bread as the animals grew. In this series of experiments the only animals which developed slight rickets had been fed on a diet of separated milk and bread, findings which seemed to support to some extent the vitamin theory; but certain considerations raised more in our minds the old and oft-quoted question of the possibility of an infection.

THE THEORY OF RICKETS AS AN INFECTION.

The difficulty of keeping the animals clean had always been noticed during our experimental work; in this experiment the full time of a laboratory boy was engaged for the feeding and care of the animals. The position of the pens enclosing the different sets of animals was changed from day to day, and to these precautions we were inclined to ascribe the mildness of the rachitic process. In his record of these results Prof. Paton drew attention to an epidemic of rickets in a kennel of fox-hounds in Adelaide which had just been reported by Bull, where removal of some of the pups to fresh ground prevented the onset of the disease.

The idea of rickets being of the nature of an infection had always been before us. I was aware of the older work of Moussu[17] and of Torane and Forte[18] and of the more recent work of Koch,[19] who said that he could induce rickets experimentally by the injection of cultures of streptococci. In my original paper I dismissed the idea of rickets as an infection, and I personally have continued to do so, for the simple reason that we have not the slightest amount of positive evidence in its favour. Apart from the work above-mentioned, comparatively little has been done to test it; at present, the more theories we have the better, so long as we appreciate that a theory is a confession of ignorance, and that its only justification is to act as a finger-post for lines of research. If rickets be of the nature of an infection then it behaves very differently from any infection that we are acquainted with. It is often compared to tuberculosis, which it is now the fashion to speak of as a dietetic disease. Tuberculosis and rickets are said to affect the poor and badly housed; but be it remembered that while tubercle is rife among native races living under their natural conditions, rickets only attacks them when they house themselves as so-called civilised men.

Nevertheless to test the infective theory of rickets we in Glasgow have carried out various sets of experiments. Prof. C. H. Browning and Dr. Haswell Wilson have attempted to obtain evidence of a specific antibody in rickets by means of the complement-deviation test. As antigen, watery and alcoholic extracts of rachitic cartilage from the ends of the long bones and ribs were employed. In no case, however, was the reaction positive, and while not necessarily negativing an infective origin their researches (no account of which has been published) lend absolutely no support to the idea. The infectious nature of the disease was further tested by injecting puppies with blood recently drawn by venepuncture from children suffering from active rickets. Not only were there no positive results of this procedure, but such fine animals as those puppies were never reared in the laboratory. The work of McCarrison on goitre, and the earlier work of Monpurgo, induced us to try experiments by feeding pups with the fæces from cases of rickets. These experiments are still in progress.

The similarity of the conditions under which typhus and rickets prevail, and the knowledge that the infection of typhus is spread by body lice, suggested to our minds the possibility of rickets being similarly transmitted. I therefore commenced to note the frequency and extent of flea-bites in rachitic and non-rachitic children, and soon found that without exception rachitic children were flea-bitten and often badly, but the non-rachitic practically not bitten at all. This, however, I was inclined to consider as merely further evidence of poor parental care and of bad hygienic conditions, since, as noted above, rickets had been observed to develop in a hospital where this factor could be eliminated.

PRESENT POSITION OF INQUIRY AT GLASGOW.

As time has progressed we in Glasgow have become more and more engrossed in the rickets problem, and have been successful in stimulating many workers to tackle the question from different points of view. Experiments on the ætiology (clinical and experimental), social and economic studies, metabolic experiments, and therapeutic tests have been going on side by side and are still proceeding, and it is thus impossible to continue the story in strict chronological order, but there remains nevertheless still much of our work to detail.

It is always possible to criticise such investigations as the previously recorded dietary studies, because one can never be certain that the child has ingested a definite amount of fat, it simply being assumed that it gets its proper proportion of the available calories. I think it is also justifiable to criticise the animal experiments, even when the diet is definitely controlled, on the grounds that the disease in man and the animal is not necessarily the same. In consequence, for conclusive evidence regarding the relative importance of the various factors one must come back to exact information obtained in the child.

The first definite experiments of this kind were made by Hess [20] of New York, who fed a series of children on a diet poor in animal fat, any fat that was present being in the form of cotton-seed oil (poor in the so-called antirachitic factor according to the vitamin school), and yet he saw no greater tendency for these children to develop rickets than those normally fed. Pirquet, of Vienna, does not consider fat an essential element of the diet of a child, and feeds many of his children on what must seem deficient fat mixtures. This, along with the supposed increased prevalence of the disease in Vienna, suggested to the vitamin school that Vienna should form a valuable centre for the study of this aspect of the problem, and the Lister Institute accordingly sent out a number of workers. We, like Pirquet, have no fear of feeding infants on a fat-poor diet, in fact, clinical experience leads us to the conclusion that such a diet is essential in many cases for the child's well being. I may, perhaps, be permitted to recall to your minds in this connexion the favour with which buttermilk has been employed as an infant food in the north of France and Belgium.

Experiments at Glasgow with Fat-Poor Diet.

For some time past Dr. J. D. Galbraith and I have been collecting information on this point. We prescribe the diets and see the cases every week, and we have no cause for doubt that the children receive the diet prescribed. In not a few cases the children have been resident in hospital and under these circumstances there can be no suspicion entertained regarding this point. Notes regarding the general development of the child are made periodically, but special attention is paid to teething, age of commencing to walk, and the condition of the bones as evidenced by X ray examination. I do not intend at present to detail these researches; the work is still in progress and Dr. Galbraith hopes to publish the results in full at an early date, but I may say that nothing has emerged to shake our confidence in our previous conclusions. Many of the children on a fat-poor diet present no evidence of the disease, and some of the most severe examples of mischief have occurred in cases fed on a fat-rich diet, and, as I have previously recorded, cases are not unknown in whom cod-liver oil, to the amount of ʒii. daily, had been given for as long a period as one year, and yet marked rickets developed.

Experiments in India.

I would like at this point to refer to certain observations, which, though not carried out in Glasgow, were made by one who had received his introduction to the subject in our departments, and who is now once more an active member of our unit. I refer to the recently published work of Dr. Harry S. Hutchison on "Rickets in India."[21] The idea of fat deficiency being the cause of rickets—although hinted at by Baxter [1] in a discussion before the London Pathological Society in 1881—did not become crystallised till the time of Bland-Sutton's observations about 1883–84. Thereafter the fat deficiency theory rapidly gained ground; in 1888, Cheadle, during a discussion on rickets at the annual meeting of the British Medical Association in Glasgow, categorically stated that "rickets is a dietetic disease" and that "the chief defect in the diet is a want of animal fat."

Stimulated by this teaching, and by the knowledge that the diet of the Indian native was poor in fat, Dr. William Huntly,[22] a Glasgow graduate and a medical missionary, thought that India should therefore be a favourable breeding ground for the disease, and commenced a survey of Rajputana, the district in which he was situated. He found, as had generally been stated, that the diet of the poor Indian was very deficient in fat, but yet rickets seemed to be practically an unknown disease. The only example which he himself observed occurred in the anæmic and wasted child of a Parsee. Huntly

therefore concluded that deficient fat in the diet could not be the cause; in view of the different amount of sunshine in Glasgow and India, he suggested lack of sunshine as the ætiological factor. Unfortunately, however, Huntly apparently had only opportunities of observing the poor Indian, an omission which Hutchison has rectified. Hutchison was fortunate in being enabled to make an extensive survey of the dietetic and housing conditions of the rich and poor of all religious beliefs in Nasik, and he has obtained results which support in a most surprising manner the conclusions of the Glasgow School. The conditions of the people could not have been better arranged in a laboratory. The housing and dietetic conditions were most sharply contrasted. In consequence of the purdah system practised by the wealthy Hindus and Mahommedans the children of the rich were much confined in airless and sunless rooms, not only during infancy, but also in the case of the girls about puberty, when they went to reside in their future husband's house. The poor, on the other hand, lived in tents or huts and led an open-air life. The various articles entering into the diets of the two classes were the same, though they were quantitatively differently distributed. There was, however, practically no difference between the energy values of the diets of the two classes, but in the poor much less of this was represented by fat than in the case of the rich, and further, what is most important, in the diet of the rich this element was present chiefly as animal fat, in the form of milk and ghee, whereas in the case of the poor, animal fat was often absent from the diet altogether, and if present only in very small amounts.

Hutchison found early rickets during infancy and late rickets in the young girl-wives prevalent among the rich and very scarce among the poor. That he was indeed dealing with early and late rickets is manifest from the numerous X ray photographs which he brought home and from the examples published in his paper in the *Quarterly Journal of Medicine*. His findings warranted no other conclusion than that, as Huntly had previously stated, the absence of fat from the diet played no part in the cause of the disease, but that rickets ensued on confinement. It is interesting to record that Hutchison noted great improvement, in fact rapid recovery in many cases, by simply putting the patients in the sun and fresh air. No change in the diet was made, the meals being cooked as usual in the patient's own home and brought to the hospital. No drug treatment was employed. These therapeutic results suggest Huntly's explanation of want of sunlight as the probable ætiological factor, but against this assumption I might point out that we get better and more speedy results by employing massage and electricity and leaving the child in its own home in the city than by sending the child to the country branch of our hospital, where there is without doubt a greater abundance of sunshine.

Therapeutic experiments have been going on in Glasgow for some considerable time. The results of some of these were recorded early last year.[23] Working on the hypothesis that confinement acted by limiting muscular movement treatment by massage and electricity was instituted, a method which has up till the present given us the best results—at least in this way, we have been able to get the child up and walking in the shortest space of time. Unfortunately, we did not in our earlier cases follow the X ray changes at the ends of the long bones, but to this Dr. Galbraith has latterly paid attention, and we have been astonished to find that although the child may be walking in a matter of four weeks little or no change may be observed in the state of ossification until two or three months later. We have not, however, observed healing to occur any more speedily by the administration of cod-liver oil and phosphorus. Park and Howland,[24] on the other hand, state that improvement is noticed in almost all cases by the end of a month after commencement of the treatment and that the bones are practically normal in two to three months. We are inclined to estimate the duration of healing at five to six months; the most rapid bone changes we have observed were consequent on exposure to the ultra-violet rays. Curiously, however, though the administration of cod-liver oil produced very definite evidence of healing as seen by X ray examination, clinical improvement—i.e., ability to walk—is totally absent. This suggests a much greater participation of the muscular system than is generally supposed, though it has always been known that muscular weakness may be so severe as to suggest to the attending physician paralysis. I might here refer to the work of Miss Henderson,[25] of Glasgow, on the creatin content of muscle in rickets. Cathcart, Henderson, and Paton[26] have shown that no change in creatin content of muscle results early from section of the nerve. Miss Henderson found in experimental rickets a diminution of creatin content to the extent of 35 per cent. Bing, it may be recalled, has described degenerative changes in the muscle of rachitic children, and these have lately been corroborated by Banu[27] and Bourguignon.[28]

Metabolism Studies.

Though we have devoted considerable time to the study of the metabolism in rickets it must be perfectly understood that this line of research has very definite limitations. From metabolism studies we may the better understand the cause of certain symptoms and the manner in which some of the changes are produced, but we will not necessarily learn anything concerning the real cause of the disease. Metabolism experiments in pneumonia and tuberculosis, for example, would not give us the least inkling of the causes of these maladies. I know, of course, that some will say I am taking a narrow view of the position, and will argue that tuberculosis is as much a dietetic disease as a bacillary one. Defective nutrition may make an individual more susceptible to tuberculous infection, but no matter how badly nourished he be tuberculosis will not arise without the tubercle bacillus. To accept any other doctrine would be to put back the hand of time by ages.

The Problem of Absorption of Fat.

We have, as you can gather from what I have already said, become more and more convinced that deficiency of fat, at least so far as intake is concerned, is not the cause of the disease. There was, however, just the possibility, though the experiments with fat-poor diets were distinctly against any such hypothesis, that while a sufficiency of fat is ingested this element is very imperfectly absorbed. Hutchison,[29] who had previously worked with us on the absorption of fat in marasmus, investigated this point and found that fat digestion and absorption were as good in rickets as in health.

Rickets and Calcium Metabolism.

Since deficiency of calcium in the bone is such a characteristic feature of the rachitic process it was thought that by studying the metabolism of this element some insight into the pathogenesis of the disease might be obtained.[30] It will be admitted that this deficiency must arise in one of three ways: (1) A deficient supply of calcium to the bones, due to (*a*) a deficient supply of calcium in the food, or (*b*) a deficient absorption of calcium from food; (2) the inability of the growing bones to fix the calcium brought to it by the blood; or (3) a non-retention of calcium by the rachitic bone—i.e., decalcification.

Deficient calcium supplied in the food as the ætiological factor was for many years a favourite theory, and found its expression in the popular view in my own town, where the disease used to be ascribed to the well-known lack of calcium in our water-supply. During last century, commencing about 1866, many workers attempted to induce rickets experimentally by depriving animals of calcium. Undoubtedly, in consequence of such a régime osseous changes result, a fact not to be wondered at when we consider the extent to which this element enters into the formation of bone. In fact, the wonder would be if no change did result. The same is even more true when both calcium and phosphorus, as some of the present-day workers are doing, are removed from the diet. Such experiments

will never help us to understand how the perversion of these elements arises, for one thing is certain—rickets does arise when these elements are being presented and ingested in ample quantity. The earlier workers—e.g., Roloff and Voit—looked upon the changes induced in this way as true rickets, but later observers—e.g., Stoeltzner and Dibbelt, working at a time when the histology of the disease was better appreciated, did not consider the condition true rickets but merely osteoporosis. The tissues generally of animals deprived of calcium are poor in this element, whereas, as we and others have shown, in rickets the tissues other than the bones do not show any deprivation of calcium. Moreover, the fact that most experimenters, and we among them, have been able to induce rickets when a normal amount of calcium is supplied, and the fact that many children develop the disease on a diet of cow's milk, which contains at least four times as much calcium as does human milk, is surely against the idea that the disease results from calcium starvation. If osteoporosis and not rickets results from the deprivation of calcium, then as a corollary the disease cannot be due to deficient absorption from the gut. Nevertheless this opinion, based on metabolism experiments in children, has often been expressed.

The chief difficulty in the evaluation of such experiments is to decide how much calcium has never been absorbed and has simply passed through the gut, and how much has been absorbed and re-excreted. These two conditions postulate different changes in metabolism. I think it is doubtful if calcium is excreted by the gut, in spite of the experiments of Grosser and Berg, which seem to support such a hypothesis. Telfer, working with us, has found that by cutting down the calcium in the diet to negligible quantities the calcium practically disappears from the fæces. Telfer's observations were made on healthy infants, and, of course, it must be admitted that the same might not occur in the presence of rickets. Ragner Berg's work was done on himself while apparently in good health, but that of Grosser, on the other hand, was carried out in both rachitic and normal children.

Experiments.

In any case much of the previous metabolism work on calcium has been done in experiments extending over only a very few days (1–3), and, as we early discovered that the calcium content of the fæces is almost constant, the output of calcium entirely depends on the amount of fæcal matter expelled, a variable factor from day to day. No reliable deductions can, therefore, be drawn from short period experiments. We thus decided to renew the work but lengthening the periods of observation to seven days or more. At first sight this might seem a very difficult matter, but by means of a special metabolism bed it is possible to collect the urine and fæces separately over such a lengthy period, and though the children are stretched out in rather a crucifixion attitude they are well behaved and give little trouble; in fact, they are usually the best behaved babies in the ward. We carried out observations in normal children and also those suffering from rickets (early and late) and, so far as we could judge, only during the active stage of the disease. For the analysis of the results, and to render these comparable with one another and also with those of previous workers, we reduced the intake and output of calcium to terms per kilo body-weight, as this seemed to us the only method allowing of comparison of children of different ages and sizes. It was a method, too, which swept away many inexplicable discrepancies between our various findings and those of other workers.

A consideration of our results and of the work of previous investigators did not seem to indicate the profound disturbance in the calcium metabolism which many had assumed to be characteristic of the disease. In no case coming under our own observation did we find a negative balance when the experiment was sufficiently prolonged to justify reliable deductions. We found that the utilisation of calcium, meaning thereby the difference between the intake in the food and the output of fæces, is proportionate to the intake, but that in rickets the parallelism is not so strict as in health. The retention in rickets is more erratic and occasionally falls below the normal, and this we are inclined to believe occurred during the active stage of the disease. In the older children, especially when the disease was of some duration, the retention of calcium was above the normal and probably indicated recovery. The utilisation of calcium both in health and disease was markedly influenced by age.

These results, however, brought us no nearer to the cause of the malady, nor did they lead us any nearer the truth regarding the behaviour of calcium. The fact that in osteomalacia and acidosis—two conditions accompanied by decalcification—the calcium is excreted chiefly by the urine, while in rickets, if excretion occurs, it is by the fæces, was rather against the idea of decalcification and increased excretion in rickets. It was thought, however, that estimation of the calcium content of the blood might shed some light, as in all probability if increased excretion occurred the calcium content of the blood would be high, whereas if deficient absorption prevailed the calcium content would be low. In our estimations we found the calcium content normal.

If the calcium is brought to the bone in sufficient amount and all evidence is in favour of such an assumption, may not the disease be due, as suggested by previous writers, to the inability of the rachitic cartilage to fix the calcium? Or may it be, as was suggested by Paton, because of it not being supplied in the proper combination—e.g., through the defect of some other element such as phosphorus. Wells has shown that cartilage introduced into the peritoneal cavity of the rabbit absorbs calcium in proportion as it is destined to become calcified or not, and it occurred to us to carry out experiments with normal and rachitic cartilage on these lines. As a result of these experiments, however, we found that rachitic cartilage absorbed rather more calcium than did normal cartilage—findings which rather supported Paton's previous contention. It is interesting to record that Kramer and Howland, though they can find no alteration in the calcium content of the blood, have been able to detect a very definite deficiency of inorganic phosphorus.

OBSCURITY OF CAUSAL PROCESS.

From a consideration of all these experiments and clinical studies what conclusions can we come to? Certainly no other than that in some way confinement and defective hygiene are the most potent causes in the production of rickets, and that the disease is intimately associated with our housing conditions. That diet plays a subsidiary part, if any part at all, I have no doubt. I would like to emphasise very strongly that I deprecate the view that rickets may have many causes, an opinion which we hear frequently expressed to-day. This is an absolutely new departure in pathology. We know of no analogous condition and therefore before we accept such a hypothesis very definite proof must be forthcoming. Moreover, such a theory simply confuses the issue, and will retard rather than stimulate research. The multiplicity of its symptomatology does not by any means support a varied cause. Everybody who knows anything about rickets appreciates that the bone changes, though the most definite, are not the sole manifestations of the disease, but that the whole economy may suffer in unison.

I admit that in assuming defective hygiene as the cause it is difficult to visualise the modus operandi of the exciting factor. It is quite different from the case of the toxin of a bacterium. Confinement and lack of exercise seemed more definite and more limited factors and might, as I have suggested, exert their harmful influence by inducing deficient oxygenation. It was the idea that confinement and defective exercise caused the disease that suggested the line of treatment—viz., massage and electricity, which has given, in our hands, the best clinical results. This

line of treatment is specially interesting in view of the observation that "Scabies or itching occurring in the course of this disease (rickets) contributes much to its cure," made by Dr. John Mayo [31] in 1674.

CONCLUSION.

And finally, as a conclusion to these somewhat discursive remarks, I would like to ask once more the question, "Is the disease as experimentally induced in animals the same as that which occurs spontaneously in the child?" I certainly thought that this was so in the early days of my work. My own original material was examined by Schmorl, of Dresden, who was at the time probably the greatest authority on the histology of the disease, and he expressed the opinion that the bone changes were identical with those seen in human rickets. I recollect very well, however, a conversation which I had with him on the matter, in the course of which he said that many of the conditions called rickets by veterinarians were not really rickets; and as time has passed I have myself come to doubt very much the validity of much of the experimental work. Far be it from my intention to belittle animal experiments (much of my own work has been of this nature), but because such and such happens in a growing dog or rat it does not necessarily mean that the same will happen in a growing child. We cannot, and I question if any good would be gained if we could, feed children on calcium- and phosphorus-free diets, but we can and do feed children on very poor-fat diets. Hess, as previously mentioned, has fed children on diets devoid of all animal fat, the tabernacle of the anti-rachitic vitamin, and yet rickets has not ensued. This is conclusive for me that whatever the condition may be which experimentalists are bringing about by administration of a fat-poor and a calcium-poor diet, that condition is not identical with human rickets.

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INTER-ALLIED CONGRESS ON CANCER.—A congress will be held at Strasbourg in the spring of 1923, when the cancer problem will be discussed under three headings: (1) the experimental production of cancer, (2) the defensive mechanism against cancer, (3) the treatment of breast cancer by radiations.

THE

Goulstonian Lectures

ON THE

INTERPRETATION OF SYMPTOMS IN DISEASE OF THE CENTRAL NERVOUS SYSTEM.

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LECTURE II.*

Delivered before the Royal College of Physicians of London on March 23rd, 1922.

ALTERATIONS in muscle tone are one of the most common and most important symptoms in disease of the central nervous system. And it is of the highest importance to be able to recognise and interpret the more characteristic changes which occur in this respect. To discuss in detail the exact causation of the normal tone of the muscles would carry me too far beyond the purpose of these lectures; nor is it possible to enter fully into the vexed though interesting question of the exact mechanism by which alterations are produced. To emphasise the clinical value of an appreciation of the different changes of tone is all that I can attempt. And it is with conditions of increased tone or hypertonus with which I would deal first.

HYPERTONIC CONDITIONS.

The terms spasticity and rigidity are applied more or less indiscriminately to states where the musculature of the limbs exhibits an increased tone. Students are taught in every text-book that it is lesions of the upper motor neurone which give rise to such spasticity or rigidity. This is true enough, but is far from being the whole truth. The upper motor neurone is a very complex mechanism, by means of which many different systems of fibres can act upon the lower motor neurone or final common path, as Sherrington has termed it. We can distinguish broadly between the hypertonus of pyramidal lesions—i.e., of lesions interrupting the corticospinal tract, and of extra-pyramidal lesions—not merely by any differences in the reflexes, a symptom beloved and yet so often unreliable, but by the intrinsic characters of the hypertonus itself.

Hemiplegia.

Take the ordinary case of hemiplegia, due to a vascular lesion of the internal capsule or in its near neighbourhood. It is common knowledge that after the preliminary stage of flaccid palsy the affected limbs become spastic. Now the characters of this spasticity exemplify the particular changes in muscular tone which occur in lesions of the pyramidal tracts. In the leg the limb is stiff in the position of extension; the extensors show an increased tone. An exactly opposite condition obtains in the arm. Here the flexors show the increased tone, thereby producing the characteristic position of the arm, adducted at the shoulder, flexed at the elbow- and wrist-joints. The greatest amount of rigidity is found in those cases where the lesion is either in the internal capsule or in its near neighbourhood. Cases due to cortical or subcortical lesions do not show so great an increase in tonus. If the observer will take the pains to investigate this increased tone in the flexors of the arms a little more closely, he will generally find that the hypertonic muscles will yield to firm passive extension of the limb at, say, the elbow-joint; they

* Lecture I. appeared in THE LANCET of April 22nd. Lecture III. will be published in a coming issue.

often give way more or less suddenly, so that the arm can then be nearly fully extended unless, of course, definite contractures have occurred. If, then, the arm be flexed again at the elbow, and the patient told to extend it, it will be found that extension can be produced up to a certain point, when suddenly the flexor muscles become tonically contracted and prevent further extension. Such—with, of course, variation in degree—is the usual picture in the paralysed arm. Contrast this condition with that found in a case of disease of the extra-pyramidal motor neurone.

Paralysis Agitans.

Take paralysis agitans, an example of a common disease. And be it remembered that this inquiry into the more particular characters of the hypertonus is not merely of academic interest only. Do we not know that many cases of paralysis agitans begin with a hemiplegic distribution of symptoms and indeed may remain in this state for a considerable time? Again, the onset of the characteristic tremor may be delayed for many months. So that we may only have some motor disability and a unilateral rigidity of the limbs upon which to form an opinion at first. Abdominal and plantar reflexes, especially in old people, are not always easy to obtain, so that we may lose this aid to diagnosis also. But the character of the hypertonus is quite different from that found in hemiplegia, due to lesions of the pyramidal tract. Instead of finding a state of hypertonus where the flexors in the arm and the extensors in the leg are predominantly affected, we find a diffuse rigidity affecting all muscles more or less equally and not altered by voluntary or passive movements of the limb. This diffuse rigidity of the limbs is often found very typically in cases of encephalitis lethargica, where a generalised condition of muscular hypertonus is very frequently to be observed, quite apart from those cases exhibiting the so-called "Parkinsonian syndrome."

Other Forms of Extra-Pyramidal Motor Disease.

There are numerous other examples of extra-pyramidal motor disease which illustrate the same point; thus, Wilson,[1] in his original description of progressive lenticular degeneration, published in 1912, clearly distinguished between the universal diffuse rigidity of the muscles in that condition and that found in the ordinary cases of hemiplegia.

In spastic paraplegia, due to disease of the spinal cord, careful study of the nature and distribution of the rigidity present can afford valuable insight into the degree of damage done to the cord. Walshe[2] has pointed out the differences between cases of paraplegia in flexion and paraplegia in extension and has considered their physiological significance. The experiences derived from gunshot wounds of the spinal cord during the war, and notably the work of Head and Riddoch[3 4] in this respect, have further emphasised these important differences in the character of the hypertonus.

Lesions of the spinal cord, which, on the motor side interfere with the functions of the pyramidal tracts only, will produce a paraplegia in extension. Here, just as in the leg in a case of hemiplegia, it is chiefly the extensor muscles which exhibit the increased tone, leading to the posture of paraplegia in extension. More diffuse and more severe lesions produce a paraplegia in flexion, where the flexor muscles are more affected by the increase in tone. And in the latter group of cases may be included those very common and distressing cases where violent flexor spasms of the legs occur, which are often so potent a cause of discomfort and lack of sleep and even exhaustion for the unfortunate patient. We see, therefore, how a study of the nature of the hypertonus present can afford not only a valuable indication of the severity of the damage done to the cord, but in certain cases may also assist in localising the anatomical site of the lesion and may even be an aid in establishing the nature of the pathological process at work. For more peripherally placed lesions will involve more the pyramidal tracts with the production of a paraplegia in extension, while more centrally placed lesions, apart from any other symptoms on the sensory side, will tend to involve other motor tracts as well, with the production of a paraplegia in flexion.

This distinction is of real value, especially in prognosis. We may, for example, see a case of compression of the spinal cord pass from a state of paraplegia in extension to one in flexion, and thereby augur the worse, till perhaps a total flaccid paralysis is reached with the picture of a complete transverse lesion. Conversely, the change from a paraplegia in flexion to one in extension is a sign of recovery of function.

Decerebrate Rigidity.

Any consideration of hypertonus as a symptom in clinical neurology would be incomplete without reference to the question of decerebrate rigidity. For numerous observers recently have claimed to find in certain disorders of the central nervous system a clinical picture analogous to the phenomenon known to experimental physiology as decerebrate rigidity. Thus, Wilson [5] has reported cases in which, with impairment of consciousness, there has been a tonic rigidity of the trunk and limbs, with exacerbations in the form of tonic or postural fits. In its most typical form the posture assumed is as follows: The arms are rigid, adducted at the shoulder, strongly extended at the elbow, with internal rotation and marked pronation; the legs rigid in extension, with adduction, feet plantar flexed. The various pathological conditions found in his cases included a cerebral tumour and a cerebral hæmorrhage, both with hæmorrhage into the ventricular system of the brain, a tumour of the mesencephalon, general septic meningitis with internal hydrocephalus, and tuberculous meningitis. Wilson quotes other cases and further gives instances which he considers cases of a partial decerebrate attitude, as found in chorea and athetosis. His paper should certainly be consulted by anyone interested in this subject. This kind of tonic rigidity of the limbs is a symptom with which nearly everyone must be familiar. Leaving aside for the moment those incomplete or fragmentary cases of which Wilson speaks, the attitude is generally seen in patients who are either unconscious or nearly so. Probably we have all seen examples in cases dying from cerebral hæmorrhage or the various forms of cerebral meningitis, particularly when there is any marked degree of internal hydrocephalus. Whatever may be the exact physiological explanation of this abnormal posture—and there is not as yet any complete agreement on this point—can we draw any definite conclusion of clinical value in these cases? The most important point to remember is that this phenomenon represents a disturbance of function only and does not in any way necessarily indicate a permanent structural disease. Whether this disturbance of function be due to removal of cortical control with the release of some lower motor centre, or whether some other mechanism must be invoked is a matter with which I cannot deal in these lectures. But as evidence that the posture only represents a functional disturbance even in quite severe examples, I may quote the following cases, where the posture was almost exactly similar while the pathological cause varied greatly:—

A male child, aged 2½, was admitted to hospital for optic neuritis. Towards the later part of his illness, which lasted some two months in all, he lay practically unconscious, flat on his back; the extensor muscles of the neck and trunk were stiff; the eyes were maintained in a position of spasmodic convergence; a typical meningeal cry was present; the arms were usually kept flexed at the elbows, but the forearms were pronated and the wrists flexed. Both legs were rigidly extended, the feet strongly plantar flexed. Post mortem a very large infiltrating tumour of the brain was found of the nature of a sarcoma. This involved practically the whole of the mid-brain and extended forwards into the crura on each side, effectually creating a physiological block between the cerebral hemispheres and the rest of the central nervous system.

In the next case it will be seen that though the same posture was present for some time, the patient recovered entirely from the disturbance of the central nervous system. For permission to publish this case I am indebted to my colleague, Dr. T. H. G. Shore:—

A male child, aged 4, was admitted to hospital suffering from an attack of lobar pneumonia, affecting the right upper lobe. When I saw the child on Nov. 10th there were quite typical signs of lobar pneumonia in the right upper lobe. But there were other and more disquieting symptoms as well. He lay on his back, with some retraction of the head; the extensor muscles of the neck were stiff; there was a double spasmodic internal squint; the spine was stiff and slightly arched; both arms were flexed at the elbows, with pronation of the hands; the legs were stiffly extended; feet strongly plantar flexed. Both knee-jerks were exaggerated, there was ankle-clonus on each side, and both plantar responses were extensor in type. Naturally, it was considered probable that meningitis was present, although the possibility of the symptoms being explained by what is called "meningism" was discussed. Lumbar puncture, however, withdrew only a very small quantity of what was practically normal cerebro-spinal fluid, which was sterile on culture. To make a long story short, he later developed signs of double mastoiditis for which two operations were performed, and it is interesting to note that from the pus in the mastoid cells the pneumococcus was recovered. After this operation all the nervous symptoms completely disappeared and it was hoped that he would recover, but he died later. At the post-mortem the brain appeared perfectly normal.

Here, then, we were dealing with a functional disturbance of the brain, probably due to an acute internal hydrocephalus which had produced a very striking clinical picture, practically exactly the same as that produced by the large cerebral tumour quoted in the previous case.

As regards the posture assumed in these two cases, it is not strictly accurate to describe it as the decerebrate attitude. They lacked the peculiar characters of the arm position—i.e., extension of the arms with marked internal rotation and pronation of the forearms. The arms in these two cases were rather in the posture assumed in hemiplegia and, in fact, a condition of double hemiplegia was present. The decerebrate posture in its typical form is found where the transaction between cerebral hemispheres and the rest of the central nervous system passes through the mesencephalon. In these cases the block was somewhat anterior to this point. But in the next case which I wish to relate the posture was found in a more complete form though as tonic fits and not as a continuous symptom.

A girl, aged 10, was admitted to hospital with the following history. Two months before admission she began to suffer from headache and to lose all life and energy. On examination in hospital she showed (1) dilated pupils with double optic neuritis; (2) slight lateral nystagmus; (3) unsteadiness in gait. She complained of severe headache and pain in the back of the neck. On several occasions glycosuria was present but cleared up without treatment. While in hospital she had a number of fits. These were preceded by a slight cry; she then became unconscious, with extension of the head and trunk, on one occasion with the production of opisthotonos; the legs were fully extended, feet strongly plantar flexed; the arms were held to the sides and extended with some pronation of the forearms. The attacks lasted only from two minutes to four minutes, and recovery after was rapid. It was considered that the diagnosis was one of tumour of the cerebellum, probably of the vermis, in view of the fits which were recognised to be of the so-called tonic or cerebellar type and of the extreme incoördination of gait which had developed. The operation of cerebellar decompression was attempted, but she died of respiratory failure before it could be completed. At the post-mortem examination a tumour was found in the third ventricle, apparently growing from its ependymal wall; this had pressed upon and obstructed the Sylvian aqueduct, thus producing a condition of internal hydrocephalus.

When confronted, therefore, with a case presenting this clinical picture, it is futile to try and argue from the posture alone whether a condition of meningitis or meningism is present; indeed, the symptom bears no relation whatever to the nature of the pathological process at work; it is purely a manifestation of disordered function.

Hypertonus in any of its clinical shapes cannot be regarded as being strictly caused by any destructive lesion; it should be regarded, as Head [6] has pointed out, as a "release" phenomenon—i.e., the lesion has upset the normal balance between the many different systems of fibres which act on the motor neurone and has allowed some particular system to exert an abnormal effect. But although we may know and can localise both during life and from post-mortem examination the situation of many of these destructive lesions, we are not yet sufficiently sure of our knowledge of the exact methods by which these release symptoms are produced.

Theory of "Kinetic" and "Static" Motor Systems.

The whole question of hypertonus, especially in regard to diseases of both the pyramidal and the extra-pyramidal motor tracts, has recently been the subject of much discussion, and Ramsay Hunt [7 8] has elaborated a theory of the dual nature of the motor system. This supposes the existence of two systems, which he terms "kinetic" and "static" respectively, the kinetic system being associated with movement and the static with the maintenance of postures. Movements and postures are of three varieties, reflex, automatic associated, and isolated synergic kinds; there are three divisions of the central nervous system, the segmental with the principal reflex arcs, the palæoencephalon, consisting of the corpus striatum and the optic thalamus, and the neoencephalon, represented by the cerebral cortex. Each of these three divisions again contains two different motor systems, kinetic and static. Thus, for example, the pyramidal or cortico-spinal motor system is designated as neokinetic, while the extra-pyramidal motor system of the corpus striatum appears as striokinetic. Ramsay Hunt has applied this theory to clinical work and has endeavoured to explain the various forms of spasticity or hypertonus in terms of disorders of the neokinetic or striokinetic systems respectively, with release of other kinetic and static systems at lower levels in the nervous axis. His theory is undoubtedly engaging, but the fact remains that we do not yet possess a sufficiently accurate knowledge of the functions of the extra-pyramidal motor systems alone to warrant an acceptance of such a hypothesis in toto. Moreover, his conclusions as to the exact site of the lesion in paralysis agitans and Huntingdon's chorea, for example, upon which his theory partly, at any rate, rests, have not yet established a whole-hearted conviction.

That different forms of hypertonus exist in disorders of different parts of the central nervous system is accepted as certain, but we are still far from being sure of their correct explanation in terms of physiology. But since it is chiefly due to clinical studies that we have learned as much as we have of the disorders of the extra-pyramidal motor system as well as of other parts of the basal ganglia, the optic thalamus in particular, it is to be hoped that a more general knowledge of disease of these parts of the central nervous system may spread and encourage further the study of this most interesting though difficult neurological subject.

HYPOTONIC CONDITIONS.

Hypotonia, or a diminution in the normal tone of the muscles, is a symptom perhaps less frequently found than its opposite hypertonus, which we have just considered. Any gross degree of hypotonia is usually obvious enough to the observer as well as to the patient. Thus, all are familiar with the hypotonia found in any severe case of acute anterior poliomyelitis, for example; the well-known tabetic hypotonia again is equally familiar, and neither of these conditions need detain us here. Lesser degrees of hypotonia, however, are not infrequently overlooked; but they are nevertheless important symptoms, both as regards the regional diagnosis of a lesion as well as an appreciation of the disability of the patient. Lesions of the spinal nerve roots may, of course, be responsible for hypotonia, either in the form of the atrophic

flaccid palsy following lesions of the anterior spinal roots, or dependent on lesions of the posterior roots whereby the continuity of the reflex arcs is broken. It is, however, in diseases of the substances of the central nervous system itself that I wish to draw attention to some rather less generally recognised forms of hypotonia.

Loss of Sense of Posture and Passive Movement.

I have already mentioned tabetic hypotonia, and, of course, any other lesion located in the posterior columns of the cord may equally well produce this condition, which is characteristically associated with a particular kind of loss of sensation—namely, a loss of the sense of position and passive movement and of the sense of tactile discrimination. It is of the highest importance to appreciate the clinical value of this symptom-complex, for it may be found as the sole remaining manifestation of an old injury or disease of the spinal cord on the one hand, or it may appear as the first symptom in some general or local disease of the central nervous system on the other. Thus, I have seen two cases where the first symptoms complained of by the patient were a difficulty in using the right hand. In neither case was there any actual motor paralysis; in each the disability appeared to consist rather in a difficulty in coördinating the required movements and was naturally more marked in the finer movements of the fingers. When more closely analysed, each case was found to present a practically complete loss of the sense of posture and passive movement, together with a gross loss of tactile discrimination and a definite degree of hypotonia. In each case this symptom was the first manifestation of disseminated sclerosis and in terms of anatomical localisation was to be regarded as a patch of disease arising in the posterior columns of the spinal cord in the cervical region on the same side as the affected limb.

Lesion of Cerebral Cortex.

A somewhat similar clinical picture may be produced by a lesion of the cerebral cortex, which involves the sensory part of the cortex only, and especially the post-central gyrus. Guthrie [9] drew attention to such cases and described particularly the muscular atrophy and changes in nutrition associated with them, and Head [3] has made a careful study of the hypotonia which may be present. He points out that such hypotonia is only found when the motor activity of the pyramidal system is intact. That such conditions may result from a purely cerebral and a purely cortical lesion is a fact of great importance, particularly when we bear in mind that, with the pyramidal system intact, this picture may exist without any of the typical changes in the reflexes usually found in paralysis from lesions of the cerebral hemispheres. When I say that I have known at least two such cases diagnosed as hysterical palsy the importance of a due recognition of this condition becomes obvious.

Atonia.

It is impossible to follow this symptom of hypotonia through all the varieties and diseases in which it may be found. I may, however, refer briefly to the question of cerebellar hypotonia or atonia. Much discussion has raged on this point, some holding that atonia is a cardinal symptom of cerebellar disease, others that cerebellar disease may exist without any hypotonia at all. The majority of opinion, however, believes now that hypotonia is one of the leading symptoms in diseases of the cerbellum or of its efferent tracts. Holmes's [10] researches on gunshot wounds of the cerebellum in man have definitely confirmed this view, and have further demonstrated the truth of the opinion that it is in recent or acute lesions especially that this hypotonia is most characteristically found. When a cerebellar lesion has existed for long—and particularly in those chronic cases of hereditary cerebellar degeneration—this symptom may be practically absent.

It is obvious, therefore, that the slighter degrees of hypotonia are a much less striking symptom than hypertonus and it is chiefly in the hope of emphasising the clinical value of an investigation into the tone of the limb musculature that I have drawn attention to a few of the more uncommon and less prominent types of hypotonia.

Alteration of Reflexes.

Any discussion even in the broadest outline of the symptomatology of disease of the central nervous system would be incomplete without reference to the study of the reflexes. This subject of the alteration of the reflexes has undoubtedly tended in the past to dominate the study of diseases of the central nervous system to the neglect of other symptoms of equal and even greater importance. This fault, for fault it certainly is, arises principally from the greater ease with which this particular disturbance of function can be examined compared with the time and trouble required to investigate alterations in sensation and motion and even such symptoms as changes in tone. How commonly even now does one see a rapid tapping of the patellar tendons, a perfunctory scratching of the sole of the foot, with perhaps a hasty and somewhat ill-directed blow on the wrist serve for an examination of the reflex functions? The discovery by Babinski of his "toe phenomenon" probably further increased the already great prominence of this symptom of altered reflexes, and it gradually came to be taught that in the pathological change of reflexes and particularly in the presence of gross exaggeration of the tendon reflexes, ankle or knee clonus, and the extensor type of plantar response, the burning diagnostic question of organic or functional disease was to be settled. This partial truth has led to much confusion and difficulty, for the student might well be puzzled to find none of what he had been taught to regard as the cardinal and essential signs of organic disease in cases where the course of the disease alone allowed no other conclusion. The multiplication of reflexes to be elicited by the observer has further tended to lay undue stress on their value. The practice of publishing some new reflex to which the observer's name is attached is one far too prevalent, especially on the Continent.

The Value of Alteration in Reflexes.

I do not propose to discuss the value of every reflex which has been described or even which is often employed. There are, however, certain broad rules of which I may remind you. Reflexes are usually described as being of three kinds: (1) Superficial or cutaneous; (2) deep or tendon reflexes; (3) organic or motor reflexes; these last are under the control of the involuntary nervous system and do not concern us here. But there is one example of this third class which I may just mention, since it is used sometimes as a test in clinical medicine. This is the oculo-cardiac reflex. I have repeatedly tried this reflex, which consists in pressing firmly on the eyeballs and noting the amount of slowing of the pulse which occurs or the absence of slowing, as the case may be. I have been unable to find that it possesses any clinical value whatever and I consider that any deductions based on the result of this test are fallacious.

Regarding the deep or tendon reflexes—these are many, but for our purpose we need only consider six: three in the upper limbs, namely, the triceps, biceps, and supinator-jerks, and three in the lower limbs, namely, the knee-jerks, the hamstring, and the Achilles or ankle-jerks. An examination of these is ample for all ordinary clinical purposes. Into the still occasionally disputed question as to whether these are really reflexes or not in the strictest sense of the term, I do not propose to enter—the most recent view holds that they are indeed so. But I do want to ask this question—Are we always quite clear as to what deductions we are going to draw from our examination of these reflexes? The first point I should like to emphasise is this: that inequality of the reflexes on the two sides of the body—*pace* any obvious explanation such as injury or old disease of

the peripheral nervous or muscular mechanism—is of greater diagnostic value than any symmetrical quantitative alteration, excluding very persistent and gross exaggeration on the one hand or absolute loss on the other. I cannot discuss all the different conditions in which these reflexes are altered, particularly as my remarks are confined to symptoms arising from disease of the central nervous system alone.

The exaggeration of the tendon reflexes, often with an accompanying clonus, is, of course, one of the cardinal signs of disease of the so-called upper motor neurone. But, as I have already said, when discussing the symptom of spasticity, this change is really a manifestation of interference with the pyramidal tracts. Hence, it is quite possible for lesions of the upper motor neurone not involving these tracts to exist without this particular symptom. Diseases, for example, which affect the corpus striatum alone or the efferent cerebellar tracts, both concerned in the innervation of the motor pathway, may easily exist without this alteration of reflexes. Again, it is well known that in hysteria, as well as in any states of fear or emotion, these reflexes are often unduly brisk. An exaggeration of the tendon reflexes—short of the occurrence of actual clonus—is therefore by itself a sign of comparatively little value; but again the importance of any inequality must be stressed. It is otherwise with loss of the tendon reflexes. Here the value of examination of reflexes other than the knee-jerk only becomes of especial value. The ankle-jerk or Achilles-jerk is even now not tested with that regularity which its importance demands. With proper precautions in the method of testing—and it is best examined with the patient kneeling—its changes afford information as valuable as in the cases of the knee-jerk, especially in cases where we have reason to believe that the lower parts of the spinal cord or the cauda equina may be involved, for its segmental level is the first and second sacral segments of the cord. Take tabes dorsalis alone as an example of disease of the central nervous system where the deep reflexes tend to become lost; how common it is to find the ankle-jerks lost at a stage where the knee-jerks may still be active. It is hardly necessary to add that pains must be taken by trying every means of reinforcement and so on to see that the reflexes really are lost. If this is the case, we should not proceed to review mentally a list of the various diseases in which this symptom arises, but should endeavour to associate it with the other symptoms of the case under examination, placing the lesion anatomically if possible—i.e., the point where the reflex arc is interrupted. The value, therefore, of this symptom is to be assessed not merely by itself, but in conjunction with the other symptoms of the case.

These statements may appear platitudes, but when a case presenting any unusual combination of symptoms is met, such as, for example, an extramedullary tumour of the cord or a cauda equina lesion where a combination of signs of pressure on the cord with signs of local affection of the nerve roots may coexist, hard-and-fast rules as to the significance of changes in the reflexes in different diseases become of little help.

Superficial or Cutaneous Reflexes.

Our knowledge of the reflex functions of the spinal cord have been much increased and clarified by experiences of the gunshot injuries of the war. And in this country we have to thank especially the work of Holmes,[11] Head,[3] and Riddoch.[4] But before considering, albeit very briefly, this recently acquired knowledge, I must say a few preliminary words on the subject of the superficial or cutaneous reflexes. There are a large number of these—namely, the corneal, pharyngeal, palatal, scapular, epigastric, upper and lower abdominal, cremasteric, gluteal, plantar, bulbocavernous, and superficial anal. Obviously, the value of this large number is that they represent a very large number of different segments of the nervous system. But, in practice, unless there is some special indication, those that are usually tested are the abdominals and the plantar. Loss of the abdominal reflex and the alteration of the plantar response from the normal flexor to the extensor type are held to indicate disturbance of function in the pyramidal tract. It is well recognised now that such changes may be quite temporary, hence we cannot conclude that this alteration in the reflexes indicates any permanent disturbance in function, much less any permanent structural disease, unless such an interpretation is borne out by the other features of the case and the changes are constant over a considerable period of time. This consideration, however, does not detract from the importance of this change as being in many cases the sole definite evidence of structural disease present. Every care, therefore, must be taken both in the testing of these reflexes and in the deductions we draw from their alteration. As to the manner of testing and the precautions which must be adopted, it is well known, and has further been recently demonstrated by Hurst,[12] that cold tends to abolish or greatly to diminish the abdominal reflex; hence the importance of testing them before the skin of the abdomen has been chilled by too much exposure. Again, in persons whose abdominal walls are loose and pendulous and in old persons these reflexes are generally absent or very feeble. But, when we can exclude such factors as these—that is, in young people with a firm abdominal wall in whom the surface of the abdomen has not been chilled—then loss of, or persistent diminution of, the abdominal reflexes and especially an inequality is a valuable sign. The same precautions as to cold apply to the plantar reflex. Care should be exercised in the manner of eliciting it; not infrequently a gentle scratch will produce an extensor response when a rough one will not, and the best point of stimulation is the outer part of the sole of the foot. Not very uncommonly have I seen such conditions as hallux rigidus and flexus overlooked, where extension of the toe was a physical impossibility. The exercise of an ordinary amount of care and observation will be enough to ensure the necessary safeguards in the methods of testing, and I have only mentioned what may appear the most elementary matters because I have found by experience that such may be neglected.

Recent Work Due to the War.

More recent work on the reflex activities of the spinal cord has increased our knowledge of them and enlarged their value when properly interpreted. The student should follow the work of Riddoch[4] and of Head and Riddoch[3] in this matter, since here I can only indicate briefly the clinical value of their investigations. As the result of the examination of cases of gunshot wounds of the spinal cord, it has been established that the first effect of any lesion of severity, be it a complete transverse lesion or only a concussion change of severe degree, is to induce a state of spinal shock in which all reflex activity below the lesion is abolished; hence, the knee-jerks and ankle-jerks will be lost and the superficial reflexes abolished. Sometimes, a slow, feeble, flexor plantar response may still be obtained. This picture is not confined to gunshot-wound injuries, but may, of course, occur in any case where severe damage is done to the cord suddenly or acutely, as in other forms of trauma, or even in cases of so-called acute myelitis.

After a time in cases where the lesion is not a complete one—be this the result of concussion, trauma, or disease—a state of increased reflex activity appears, which is accompanied by a spastic paraplegia. Where the lesion has been complete, this stage of increased reflex activity may also appear and, moreover, endure, provided that complications in the shape of infections due to sepsis of the urinary tract or bedsores have been avoided. These two conditions of incomplete lesions with exaggeration of reflex activity and complete lesions with return of reflex activity are not to be confused, but as regards the plantar reflex and its

nature, they may for the moment be studied together. Briefly, then, the work of Walshe [2] and Riddoch [4] has shown that the extensor plantar response or the Babinski toe phenomenon is only a part of a flexion reflex of the limb, the movement of dorsiflexion of the hallux being accompanied by a contraction of the hamstring muscles. In cases of severe injury to the cord not only does the field in which an effective stimulus is applied become enlarged, but the whole reflex as it were becomes exaggerated, so that in some cases almost any contact with the leg will suffice to produce a general movement of flexion of the whole limb. This is, in fact, the explanation of the painful flexor spasms which occur in many paraplegic patients. In cases of complete lesions of the cord Riddoch [4] has shown that, when reflex activity begins to return, this flexion reflex is the first to return and remains the most prominent. Further, in such cases it may be accompanied by other manifestations, excessive sweating in the area below the spinal lesion, and automatic evacuation of the contents of the bladder. To this reflex which occurs only when the lesion has been complete and when a stage of greatly increased reflex activity of the isolated cord has taken place, Head and Riddoch have given the name of the "mass reflex." In the incomplete lesions which occur in civil practice as the result of disease we must not expect to see as a rule this mass reflex in its purest form, but we may see it in a modified state when the flexion reflex is well developed. It is important, therefore, to be familiar with its occurrence and to be able to interpret its significance. For example, in a case of acute paraplegia, where all power has been lost and where all reflex activity has been temporarily abolished, the appearance of this reflex may be the first sign of some recovery of function. Conversely, its disappearance may herald a change for the worse and indicate the evil effect on the cord of septic infection from cystitis and bedsores.

The various modifications of the plantar reflex known by different observer's names, such as Gordon's sign, or Oppenheim's sign, and so on, should not be painfully culled to the memory as so many different reflexes. They are only the same reflex obtained by a stimulation of a different receptive area of the limb; hence their presence only indicates a greater facility of response and has no other or different diagnostic value. All these specially named varieties of this reflex should be eradicated from text-books.

One other superficial reflex may be mentioned before I have done with this subject. This is the bulbo-cavernosus reflex, which appears to be little known or employed as a general rule; its value lies in the fact that its segmental level is at the lowest point of the central nervous system, the fourth and fifth sacral segments. Hence, in lesions of the lower part of the spinal cord or of the cauda equina, it is often a most valuable aid in diagnosis.

I have only been able to deal very briefly with the subject of reflexes and have indeed tried to emphasise only general principles, rather than any particular diagnostic value possessed by any one reflex in any particular disease. Like every other symptom, changes in the reflexes deserve close attention, but they should not be allowed to dominate our conception of neurological investigation to the exclusion of other symptoms.

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THE SLEEP OF ELEMENTARY SCHOOL CHILDREN.

BY MALCOLM GROSS, M.B., B.S. LOND., D.P.H.

DURING the past year I have been endeavouring to determine, first, the amount of sleep obtained by elementary school children; and, secondly, any relation existing between the amount of sleep and their condition of health. To do this, in the course of school medical inspections, I have appended to a copy of the usual medical records of a number of children, taken indiscriminately, certain other records. The communication must be regarded as a preliminary one. Among these records are:—

1. A note on the lethargic appearance and behaviour of the child or otherwise. Grading is as follows: 1 = wide awake, 2 = medium, 3 = lethargic.

2. A note, obtained by questioning parent, as to whether the child has to be waked in the morning.

3. A note, obtained by questioning parents, as to the length of time the child sleeps. I have not put this question directly, but have inquired the time at which the child (*a*) goes to bed, (*b*) goes to sleep, (*c*) wakes up, and (*d*) gets up.

I have obtained in this manner a separate record for winter and summer. Hours of sleep did not tally all the year round, more being taken in the winter than in the summer months. By summer is meant the period of the year during which the Summer Time Act is in force; the rest of the year is called winter.

Precautions to Secure Approximate Accuracy.

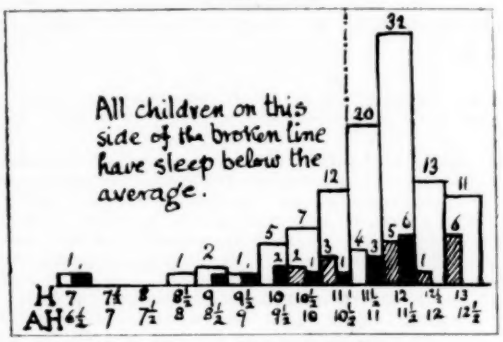
I have tabulated these records, and have also placed them in the form of a series of charts constructed in as simple a manner as possible. From the very beginning I did not anticipate strikingly cut-and-dried results; medicine does not tend to encourage the focus of statistics on its problems, and in an obscure question of this nature many unrecordable conditions must necessarily obtrude and confuse the issue. For instance, it has been practically impossible for me to obtain any sufficiently detailed and individual record of the quality of the sleep or the environment of the sleeper; again, even the quantity obtained is open to very serious question. After careful thought I decided that it was advisable when dealing with children up to the ninth year to add half an hour all round to the time of going to sleep as given by parents; similarly, with children aged 12–14 it was advisable to add on one hour.

My reasons for doing this are as follows:—

(*a*) I am convinced that many parents—consciously or unconsciously—exaggerate the early hour of their children's retirement to bed and sleep. Some parents are, no doubt, inaccurate in their statements, and it is difficult to imagine the inaccuracy being at all on the side of late retirement. I am not alone in this conviction; during a reply by a parent to my question on this matter I have often seen a general expression of disbelief overspread the faces of the remainder of the company, and sometimes the opinion has been backed up by a decided opinion. Also we sometimes see children playing in the streets quite late in the evening. Out of 106 children of 3–6 years, taken at random, I have two recorded as going to bed at 8.30; the rest are said to go earlier—*none later*. This I find difficult to believe.

(*b*) All parents do not attend the school medical inspection of their children; this, of course, is very largely due to their occupations, but in view of the fact that in the majority of cases of children up to the ninth year a parent usually attends, whereas in the majority of cases of children aged 12–14 a parent does not attend, it is natural to suppose that, on the whole, they are the least careful parents who do not attend. Of their children it is impossible to record the hours of sleep. It is logical to assume that these children would reduce the average number of hours of sleep obtained by their age group. Largely in the

CHART 1.


All children on this side of the broken line have sleep below the average.
H 7 7½ 8 8½ 9 9½ 10 10½ 11 11½ 12 12½ 13
AH 6½ 7 7½ 8 8½ 9 9½ 10 10½ 11 11½ 12 12½

H = hours. AH = amended hours.

All children on this chart have less than the amount of sleep recommended by Dr. Dukes for a child of 6. The chart shows hours of sleep obtained by 106 infants between the ages of 3–6 (one of 7 included); 87 are between 4 and 5.

The charts are drawn to scale. Each whole column represents the number of children—indicated at the head of the column—who obtain the number of hours sleep recorded at the base of the column. The blacked portions of the column represent lethargic children—the shaded portions bright children—numbers being again shown at the head of these portions. In Chart 1 it is to be noted that 27 per cent. of children get sleep below the average, which is 11 hours. All children obtain sleep below Dr. Dukes's standard. The grouping of bright and lethargic children is very irregular, but only in the group obtaining 12½ hours' sleep do bright children preponderate. It is also seen that no lethargic children occur in the groups obtaining 12–12½ hours' sleep. It therefore seems to me that 12 hours' sleep for this group is the very minimum. Dr. Dukes recommended: age 3, 16 hours' sleep; age 4, 15 hours' sleep; age 5, 14 hours' sleep; age 6, 13 hours' sleep.

light of this consideration I have added a full hour to the time of going to sleep of the 12–14 year old children, but there is also another.

(c) The group of children aged 12–14 are certainly far less under the control of their parents than the groups of lower age; in many cases a parent has complained to me of inability to control children who have attained this age and to get them indoors and to bed as early as they should: it is conceivable that many others in the same position say nothing, or even disguise it. Without amendment of the figures supplied to me, it would still be seen that a large number of children have an insufficient amount of sleep.

The Amount of Sleep Necessary to a Child.

As regards the periods of sleep necessary for a child at different ages, authorities vary considerably in their opinions. The following hours of sleep have been recommended by Dr. Clement Dukes in *School Hygiene*, November, 1921:—

	Hours.		Hours.
At birth	23	8 years of age ..	12
1 year of age ..	20	9 ,, ,, ..	11½
2 ,, ,, ..	18	10 ,, ,, ..	11
3 ,, ,, ..	16	13 ,, ,, ..	11
4 ,, ,, ..	15	15 ,, ,, ..	10½
5 ,, ,, ..	14	17 ,, ,, ..	10½
6 ,, ,, ..	13	19 ,, ,, ..	9½
7 ,, ,, ..	12½	All other ages ..	9

These hours are somewhat longer than those apparently thought sufficient by some authorities, but I am very doubtful whether much reduction is possible without some risk of detriment to the child. I have seen so very few children "perfect" as regards mental and physical attributes that, at present, I feel powerless to dispute them. It will be seen on reference to the charts that:—

Group.	Percentage attained to	Dr. Dukes's standard for
3–6 years.	0	6 years.
8 ,, ...	8 ..... (roughly)	8 ,,
12–14 ,, ...	2	15 ,,

These percentages are based on winter records to avoid the effect, if any, of the Summer Time Act.

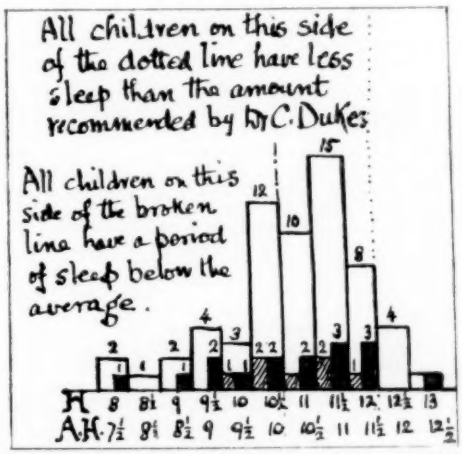
The following tabulated results were arrived at by me for the summer and winter periods respectively.

Winter Record.

Age in years.	Retire.	Asleep by—	Wake at—	Get up at—	Have to be waked.	Fatigue signs.	Average hours sleep.	Amended figure.
	P.M.	P.M.	A.M.	A.M.	%	%		
3–6*	7.30	7.30	7	7.30	10	14	11½	11
8	7.30	8	7	7.30	30	20	11	10½
12	9	9	7.30	7.30	56	24	10½	9½
Summer Record.								
3–6*	8	8.30	7.30	7.30	34	23	11	10½
8	8	9	7.30	7.30	43	33	10½	10
12	9	9.30	7.30	7.30	43	48	10	9

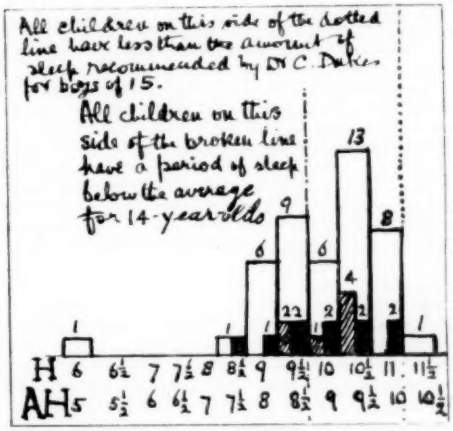
* Entrants.

CHART 2.


All children on this side of the dotted line have less sleep than the amount recommended by Dr C. Dukes
All children on this side of the broken line have a period of sleep below the average.
H 8 8½ 9 9½ 10 10½ 11 11½ 12 12½ 13
AH 7½ 8 8½ 9 9½ 10 10½ 11 11½ 12 12½

Showing in a similar manner to Chart 1 the disposition of children 8 years old in regard to their hours of sleep. Roughly, 38 per cent. of these children obtain sleep below the average number of hours, which is 10½. Roughly, 8 per cent. reach Dr. Dukes's standard—12 hours—for this age. Bright and lethargic children are very irregularly distributed. The number of bright children is almost negligible, but roughly one may say that in all the groups below Dr. Dukes's standard 20 per cent. are lethargic.

CHART 3.


All children on this side of the dotted line have less than the amount of sleep recommended by Dr C. Dukes for boys of 15.
All children on this side of the broken line have a period of sleep below the average for 14-year olds
H 6 6½ 7 7½ 8 8½ 9 9½ 10 10½ 11 11½
AH 5 5½ 6 6½ 7 7½ 8 8½ 9 9½ 10 10½

This chart is similar to Charts 1 and 2 and shows the disposition of the group of children aged 12–14 in regard to their hours of sleep. It will be found that of this age group 38 per cent. obtain sleep below the average for a child of 14, which is 9 hours. Lethargic children are evenly scattered throughout the groups, and bright children are rare, while the percentage of children attaining Dr. Dukes's standard for children aged 15—namely, 10½ hours—is negligible. The charts are founded on winter figures only.

A consideration of these charts and tables shows that a very small percentage of elementary school children attain the hours of sleep recommended by Dr. Dukes; most have considerably, and many far, below his standard. (This remains true, though, of course, to a lesser degree if parents' statements are not corrected as already explained.) The percentage of children showing fatigue signs, and also the percentage to be waked in the morning, increases with the age of the children; this fact indicates gradual and premature freeing of the children from parental control. As regards variation in hours of sleep in summer and winter, Dr. T. Dyke Acland in his work "On the Hours of Sleep in Public Schools" (Churchill: 1905), determined that boys of 13–16 years might be allowed half an hour's sleep less in summer than in winter.

This rule is apparently carried out by elementary school children throughout school life, as shown by my records:—

Hours of Sleep.

Age in years.	Summer.	Winter.
3–6	10½	11
8	10	10½
12	9	9½

But I am by no means convinced that the addition of a half-hour to the first two groups and one hour to the third group is sufficient for summer records, taking into consideration the increased temptation to error in statement in this half of the year. By this I mean the greater difficulty in getting children, especially the older ones, home from play whilst it is yet light enough for games, and also the increased tendency of parents themselves to remain out with the family in the late summer daylight. Again, some parents apparently think their children need not go to bed in daylight; others say the children cannot sleep until dark; also children playing in the streets may prevent children in bed from getting to sleep. But apart from this question, the elementary school child obviously gets too little sleep in winter, and certainly should not have even less in the summer. Dr. Acland permitted the decrease of half an hour's sleep in the case of boys who were having their fair amount of sleep in winter. Moreover, Dr. Acland's boys decreased their sleep largely by getting up earlier, not by going to bed later, as do the majority of the elementary school children.

Conclusion.

The question of the effect of the Summer Time Act on children's health appears to me to involve the tendency to decrease the already insufficient amount they obtain.

For the present my conclusions are as follows:—

1. Elementary school children do not get enough sleep in winter.
2. They get still less sleep in summer.
3. For the diminution of sleep in summer the Summer Time Act is partially responsible.
4. The Summer Time Act need have no effect were parental control what it should be.
5. The ideal procedure is to improve parental control and knowledge and continue with summer time. Until this improved control and knowledge is obtained summer time is detrimental to the vast majority of children.
6. Parents should be encouraged to obtain longer sleep for their children the whole year round.

I am aware that so far I have done little more than touch the fringe of a big question, but something is effected if I have drawn attention to the inadequate sleep obtained by so many elementary school children, and I hope to elicit the experience of others who have had similar opportunities of observation. The object in view is to define more fully and accurately the relation between sleep and the general health of the child, and also to prove the association of lack of sound sleep with the presence of certain defects—of which association I am highly suspicious, although I have not yet collected sufficient material for sound argument.

THE MODIFICATION OF
COW'S MILK IN INFANT FEEDING.*

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No method of infant feeding, natural or artificial, can comply with all the physiological requirements unless at least the following conditions are fulfilled.

1. The calorie or energy-value of the food must be sufficient to supply all the demands of (*a*) growth and repair, (*b*) heat production, (*c*) mechanical work, and (*d*) the elaboration of secretions.
2. The balance of the three main elements of food—i.e., proteins, fats, and carbohydrates—must be approximately in the ratio of 1·5, 3·5, and 7—i.e., as in breast-milk.
3. All such accessory factors as salts, organic or otherwise, lecithin, cholesterol, extractives, vitamins, &c., must be supplied in adequate quantity.
4. The food must not only be adjusted to the digestive capacities of the infant for the time being, but it must also be of such a character as to promote their further development.
5. The food must not contain pathogenic or harmful bacteria, and it must be given at such intervals and in such manner as to promote the development of favourable habits.

According as a food or a method of feeding fulfils the above conditions or fails to do so, so is it good or bad. In the course of this lecture it will be my object to explain how the required conditions can be complied with when cow's milk forms the basis of the food.

Faulty Methods in Artificial Feeding.

Methods of artificial feeding would long ago have reached a more satisfactory stage of evolution had their various shortcomings been revealed by immediate symptoms instead of by long-deferred effects. Hence faulty methods which should have been expunged from the list have been allowed to survive. To illustrate my point, certain foods such as the specialties of wholesale manufacturers may be consumed by infants without provoking any obvious symptoms for several months in succession and at the end of this time may produce serious symptoms which are now recognised as due to vitamin deficiency. It is regrettable that unsuitable foods of this kind do not display the danger flag until serious damage has been inflicted. This postponement of obvious symptoms, combined with defective knowledge of scientific principles of dietetics, have been the opportunity of the enterprising manufacturer who produces patent and proprietary foods by the ton, which have the merit of being extremely digestible and consequently do not produce immediately recognisable symptoms of indigestion, however much they may defy the other canons of physiological feeding. While we of the medical profession have been struggling to render one of the most indigestible of foods—i.e., cow's milk—even tolerably suitable for infants by processes of attenuation or modification, the man of commerce has won the confidence of the British matron by supplying her with malted or predigested foods which do not disturb digestion and only reveal their faults when it is too late to refer them to their true causes. As I shall hope to prove, it is by no means impossible to employ cow's milk, wet or dry, as a basis for an infant's dietary in such a way that every one of the five physiological postulates above enumerated are completely complied with. Taking these five cardinal rules one at a time, let me first deal with the matter of quantity.

Approximate Food Values.

Every infant has a definite food requirement which is best measured in terms of calorie values, and

* Summary of a lecture delivered to post-graduates from the Fellowship of Medicine at the St. Marylebone General Dispensary, February, 1922.

granted that it is not always possible to gauge the quantity with complete exactitude, it may, for all practical purposes, be assumed that the average baby under 1 year of age requires in the 24 hours food of the value of 50 calories for every pound of body-weight; thus, for instance, the normal baby 3 months old and weighing 11 lb., requires in the 24 hours food of the value of $11 \times 50 = 550$ calories. The value of human and cow's milk is approximately 20 calories per ounce, full-cream dried milk has a value of about 150 calories per ounce, while condensed milk has a value of about 100 calories per ounce. If the above infant were fed on breast-milk or cow's milk he would require 27 ounces in the 24 hours. While of dried milk he would require 3½ ounces and of condensed milk 5 ounces. None of these foods given in the above quantities, and without modification or additions (with the exception of breast-milk) would fulfil any of the above postulated requirements with the exception of No. 1—i.e., that which refers to quantity. Their chief defect lies in a faulty balance, which will now be considered. It is extremely easy to supply the infant with the correct number of calories when modified cow's milk is the basis of the diet, so long as the modification is to breast standard, for under such circumstances the calorie value of the food will be the same as that of breast-milk—i.e., about 20 calories per ounce. But no matter how accurately a diet may comply with the calorie requirements, nevertheless if the balance or ratio between the three main constituents—i.e., the proteins, the fats, and the carbohydrates—is not also reasonably correct, in the long run the infant's nutrition will be bad.

Correct Balance an Essential Condition.

Animal experiments prove very clearly that correct balance is one of the essential conditions of good nutrition, although each species of animal or each variety has its own optimum ratio. So far as infants are concerned, the ratio between the nitrogenous elements—i.e., the proteins—and the non-nitrogenous elements—i.e., the fats and the carbohydrates, must be maintained at or about 1 to 7—the ratio in a good sample of breast-milk. Further, the ratio between fats and carbohydrates should be as 1 to 2. If these ratios are widely departed from it is easy to predict the ultimate results, for the symptoms of protein excess or deficiency are perfectly well known, as indeed are the results of excess or deficiency of sugar or fat. Undiluted cow's milk in which the ratio between the nitrogenous and the non-nitrogenous elements is as 1 to 2, cannot be employed as a substitute for breast-milk in which the ratio is as 1 to 7 without doing violence to the metabolic functions of the infant; nor on the score of the ratio between the fat and carbohydrate content is such milk any more suitable as a food for infants, as may be realised by a comparison of their respective percentage compositions.

It is, however, quite easy to modify cow's milk so as to bring the ratio of its principal constituents into harmony with the physiological requirements of the infant by any one of the following methods:—

1. By diluting cow's milk with an equal part of water and by fortifying it with additional fat and sugar, the so-called "half-and-half" method.
2. By diluting a thin cream containing 7 per cent. of fat (obtained by allowing milk to stand for a certain number of hours and siphoning off the lower half) with an equal amount of water, and adding 5 per cent. of sugar, the so-called "top-milk" method.
3. By fortifying whey with cream and sugar, the so-called "split-protein" method.

The first of these methods is the simplest, and possibly the best, although it does not make allowances for differences in the two kinds of proteins—i.e., caseinogen and whey proteids, which exist in different proportions in cow's milk and breast milk. The formula for modifying cow's milk by the "half-and-half" method will be given later.

Of the many anomalies which surprise and puzzle critics of our national methods of artificial feeding there is none so amazing and inexplicable as the practice of altering the balance of artificial substitutes for breast milk as the infant grows older. In accordance with this practice, if an infant is fed on cow's milk dilutions it is at first starved on 1 in 3 or 1 in 4 mixtures, and later fed on whole milk or other strong mixtures in which the protein elements are in enormous excess. It is perhaps hardly necessary to point out that breast milk does not become stronger or contain a higher percentage of protein as lactation proceeds, or that the physiological requirements for protein are greater as the infant grows older.

Accessory Factors.

Important as it is to secure accuracy with regard to both caloric value and balance, it must be remembered that though a food may be quite correct in these respects it may still be a bad food for infants if it does not contain the requisite representation of all the accessory factors. We know that all the accessory factors required for the maintenance of satisfactory nutrition are present in breast milk and in approximately the right proportions; we do not know, however, that they are all represented in cow's milk or that those which are present are in the right proportion for the human infant, indeed, there is every reason to suspect that such is not the case. We do not know definitely what all these accessory factors are, we know, however, the following are necessary and important: salts, organic and inorganic, extractives, lecithin bodies, cholesterol, vitamins, &c. If all of these chance to be present in cow's milk in the same quantities that they are present in breast milk, they would necessarily be present in inadequate amount in milk modifications prepared by the usual methods of dilution. The part which these various accessory factors play in nutrition is of paramount importance. We know all about the vitamins, or we think we do, but we know very little about the parts which the lecithin bodies, cholesterol, and the extractives play in metabolism; their functions are probably quite as important as those of the vitamins. In the building and maintenance of the growing organism they probably subserve purposes comparable to those which nails, screws, bolts, fastenings, soap, dusters, brooms, polishes, &c., play in the completion and upkeep of a house, and bear the same sort of relationship to the ternary constituents of food—i.e., the proteins, fats, and carbohydrates—as do nails, screws, &c., to the main building materials of a house—i.e., the bricks, the mortar, and the woodwork.

Broth as a Supplement to Cow's Milk.

I have been at some pains to discover a practical means of supplementing cow's milk dilutions with a satisfactory hotchpotch of such accessory factors as may be supposed to be attenuated below the safety line in the preparation of cow's milk modifications, and have finally come to the conclusion that the addition of a few ounces of broth, made from bones and mixed vegetables, can supply the deficiencies, although it must be admitted that this devise lacks accuracy and precision.

A food for infants, however, may be correct as regards calorie value, balance, and inclusion of all the accessory factors, and yet be a thoroughly bad food unless the infant can digest it and unless it is also designed to develop still latent digestive capacities. Cow's milk, even when diluted, as in the "half-and-half" method, is highly indigestible; for this reason it should never be given in the first instance to an infant without preliminary predigestion. At first the mixture should be very completely predigested, say for two or three hours, and then as the infant learns how to digest it for itself the time of predigestion may be gradually reduced, say by some 10 minutes every day. This precaution obviates the breakdown of the digestive functions so familiar in the case of infants fed on cow's milk modifications; the argument that some infants muddle through without any previous education is no argument for trying the dangerous experiment of giving them milk dilutions which have

not been predigested. The food, however, may be quite correct as regards calorie value, balance, accessory factors, and digestibility, and yet if it is given too frequently or without previous sterilisation, it may still give bad results. In my opinion cow's milk dilutions should always be sterilised before being given to the infant; nowadays none but faddists think that this operation damages the nutritive properties of the food, and all are agreed that there are dangers in giving to the infant certain of the pathogenic organisms which not infrequently contaminate raw milk. The following formula may be employed for modifying cow's milk to breast standard.

Milk (of average quality)	10 oz.
Cream (33 per cent.)	1 oz.
(Or cream (48 per cent.)	¾ oz.)
Sugar (milk sugar at first, but later milk sugar, maltose and cane sugar mixed) ..	1 oz.
Broth	4 oz.
Water to make	1 pt.

Humanised milk prepared in accordance with this formula has a calorie value of 20—i.e., the same as breast milk, the balance is also the same, and through the medium of the broth it is also provided with most of the accessory factors which may not be present in sufficient amount after dilution of the cow's milk. It may be wise, however, to give orange-juice independently. The formula for preparing a bone and vegetable broth which will contain the required elements is as follows:—

Take 1 lb. of bones and chop them up well so as to open up the marrow cavity, add one tablespoonful of vinegar and 1½ pts. of water, allow them to simmer for about eight hours, and then add a handful of mixed vegetables such as cabbage, brussel sprouts, spinach, roots, lentils, &c., with a few sprigs of Irish moss and allow to simmer for one hour longer. Then strain and allow to set into a jelly.

Such a broth, besides containing gelatin, which is a good acid fixer, animal extractives from the attached meat and bone marrow, also contains a considerable number of vegetable extractives, possibly vitamins, lecithin bodies, organic salts, and cholesterol. The object of adding the Irish moss is to provide a source of iodine, an element which is present in very small amount in diluted milk, but all the same very necessary in the animal economy. The rationale of adding the vinegar is to dissolve out the calcium salts and supply them to the infant in a highly available condition.

Since I have adopted this plan of adding broth of this nature to milk dilutions, which have been otherwise modified to breast standard, my results have been very distinctly improved, and I am constantly receiving confirmatory reports from others who have adopted this method. There is nothing final in this suggestion for supplying the various accessory factors which are necessary for satisfactory nutrition, and which may be absent or deficient in milk mixtures, but it is at least an attempt to remedy a defect which must be obvious to those who give the matter a moment's consideration.

DEATH OF DR. S. J. BROOKS.—Samuel John Brooks, who died at Over Haddon, near Bakewell, on April 13th, in his sixty-second year, was until October last in practice at Eyam, where he held the appointment of medical officer to the Board of Guardians. He was the eldest son of the late Dr. R. W. T. Brooks, of Serjeant's Inn, Fleet-street, London, and was educated at King's College School and King's College Hospital, London, when the students had the advantage of Lister's presence on the teaching staff. He obtained the qualifications of M.R.C.S., L.S.A., and practised for some time at Mossley, near Manchester, where he married the daughter of the late Dr. J. N. Seville, formerly a medical practitioner in that town. Later he settled at Eyam, Derbyshire, where he conducted a large practice, and where from the beginning—as might have been expected from his training—he was known as an enthusiastic supporter of the antiseptic teachings before they had become part of the general equipment of the medical profession. Dr. Brooks was well known as a lover of horses, and carried on his practice with the assistance of well-chosen animals often of his own breeding. He never made use of a motor-car. His death after a short period of retirement is a source of sincere regret to a large circle of friends and old patients.

THE TREATMENT OF MALIGNANT DISEASE BY A DIET FREE FROM FAT-SOLUBLE VITAMIN A.

A Report made to the Medical Committee of the Cancer Hospital, Fulham-road, S.W.

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IN January, 1921, at the request of Dr. S. Monckton Copeman, F.R.S., of the Ministry of Health, an investigation was begun at the Cancer Hospital into the effect of a diet free from the fat-soluble vitamin A on patients suffering from cancerous growths. The fact that such a diet causes grave nutritional defect, and ultimately death, in young rats fed with it, while older animals are affected to a very much less degree or not at all, suggested the possibility that malignant cells in the human body might suffer a similar fate and that a malignant mass, though it would certainly not be destroyed, might yet be so hindered in its growth as materially to prolong life, and the cachexia produced by it diminished or prevented.

Difficulties of the Investigation.

The difficulties in carrying out such an experiment must be and have proved very great. They were as follows:—

(1) The vitamin is widely distributed throughout the various articles ordinarily employed for human consumption. It is comparatively resistant to external influences, and to destroy it while leaving the food in a palatable condition is impossible. Dr. Copeman,[1] however, had drawn up a list of foods which either do not contain it, or contain it in minimal quantity only, and from this not only a sufficient but quite attractive and varied dietary was obtained. Even so, one great difficulty was encountered: milk is particularly rich in the fat-soluble vitamin and some substitute for it had therefore to be found, since without it several foods otherwise suitable would be unavailable and, worst of all, many of the patients would be deprived of tea and cocoa. Solac[2] was used for this purpose. It is an imitation milk prepared entirely from vegetable matter and containing protein, fat, and carbohydrate in the same proportions as cow's milk. At first its use led to some complaints on the part of the patients, but in a short time they became accustomed to it and made no further objections. Dr. S. S. Zilva, of the Lister Institute of Preventive Medicine, kindly tested solac on rats to demonstrate its freedom from fat-soluble vitamin, and reports that it is completely lacking in this substance.

(2) It is impossible to control the dietary of a patient with absolute certainty, especially quantitatively. One must trust to the intelligence and coöperation of the individual, which is not always proof against the clandestine and mistaken efforts of visiting friends. The introduction of food in this manner was prevented as far as possible, but nevertheless some may have been smuggled in.

(3) It was not expected that an inoperable tumour should be caused to disappear by means of this diet; a stage must obviously be reached when the growth is beyond all possibility even of inhibition. On the other hand, it is equally obvious that no patient with an operable growth could be treated by this method to the exclusion of surgical measures. It was hoped, however, that patients might be found in whom the tumour, though inoperable, might be sufficiently circumscribed to offer a reasonable prospect of improvement in suitable circumstances. Few, if any, such patients were obtained, for in the majority of cases the patient will only consent to come into hospital when the growth has attained such dimensions as seriously to interfere with her well-being.

[1] Copeman, S. M.: Brit. Med. Jour., 1920, ii., 159. Discussion on "The Present Position of Vitamines in Clinical Medicine."
[2] Prepared by Solac, Limited, 221, Tottenham Court-road, London.

Results of Investigation.

The investigation began on Jan. 18th and was terminated on Dec. 18th, 1921, thus lasting 11 months. During this time 64 patients underwent the treatment, of whom 5 might be accounted patients such as we desired, 10 others were on the border-line, and the remainder were too advanced and extensive to offer any hope of improvement. Three of the five are still in hospital, 1 died, and 1 left the hospital at her own request after 13 days on the diet. Of the 10, 2 died and 8 left the hospital, all at their own request, 3 of them after less than a month on the diet. Altogether 29 of the patients died and 35 are or were alive when they left the hospital. The periods during which they were under treatment are :—

Less than	1	month	..	..	..	..	..	..	..	18
More than	1	month	and	less	than	2	..	..	..	18
,,	,,	2	months	,,	,,	,,	3	..	..	7
,,	,,	3	,,	,,	,,	,,	4	..	..	6
,,	,,	4	,,	,,	,,	,,	5	..	..	2
,,	,,	5	,,	,,	,,	,,	6	..	..	2
,,	,,	6	,,	,,	,,	,,	7	..	..	3
,,	,,	7	,,	,,	,,	,,	8	..	..	2
,,	,,	9	,,	,,	,,	,,	10	..	..	2
,,	,,	10	,,	,,	,,	,,	11	..	..	1
,,	,,	11	,,	,,	,,	,,	12	..	..	3
						Total	..	..	..	64

—i.e., more than 50 per cent. received less than three months' treatment and 8 died after less than one month on the treatment.

The various diseases were as follows :—

Hypernephroma	1	Carcinoma—	
Intramedullary glioma of spinal cord	1	mammæ	18
		cervicis	17
General sarcomatosis (melanotic)	1	recti	11
		vulvæ et vaginæ ..	7
Lymphosarcoma	1	ventriculi	1
Sarcoma mammæ	2	ovarii	1

There was also one case of adiposis dolorosa. In the majority of cases it is impossible to determine the date of onset of the disease, but previous to the start of dietetic treatment the duration of symptoms was :—

6 months or less ..	16	More than 2 years	12
1 year or less	16	Unknown	2
2 years or less	17		

For the 21 who took the diet for more than three months the figures were 3, 5, 5, 7, and 0 respectively. In 24 of the total number (9 of the 21) the diagnosis was confirmed microscopically, in the remainder no microscopic examination was made. One of the patients had no malignant disease. All who were in a fit condition were weighed weekly throughout the treatment. Many gained weight at first, but some of these subsequently lost again, and at the end of treatment ten were 1 to 8 lb. heavier than at first, while 17 weighed 1 to 21 lb. less.

It would probably be quite unjustifiable to attribute any specific effect to the diet in less than three months, and impossible to draw any definite conclusions from such a limited number of observations (only 21 cases of three or more months on the diet) ; but at least one or two statements of a more or less general nature may confidently be made.

(1) In no case was any effect found on the growth and evolution of the tumour, which invariably progressed along the usual lines. Increase in size, superficial ulceration, and hæmorrhage were neither prevented, delayed nor diminished. Where ulceration occurred during treatment secondary infection took place as readily as in other patients, and when ulceration was already present no influence was discovered upon the severity of the secondary infection, or upon the amount and character of the discharge.

(2) In no case was any unfavourable change in the general condition of the patient attributable to the diet ; and, in many, improvement was definite, at least at first. The increase in weight has already been mentioned, but it is necessary to point out that this is not a certain guide as to the patient's progress, since three cases who increased in weight died while their weight was still greater than when they first came under observation. Nevertheless, it is quite certain that general improvement, though slight, was in some instances definite.

(3) It is doubtful whether or not the amount of pain suffered by the patient is diminished by the diet. In most cases it certainly was not, but three patients—two of carcinoma of the rectum and one of carcinoma of the vulva and vagina—saw the experiment through, and the sisters in charge of the wards are decided that in all three the pain suffered is less than that suffered by the majority of such cases. It is remarkable that this should be true of all three patients ; but the number is very small and the variability from patient to patient in the intensity of pain caused by a cancerous growth—and in the manner in which such pain is endured—is so great, that I hesitate to lay much stress upon this observation.

(4) Cramer, Drew, and Mottram[3] report that rats and mice fed on an avitamin diet show changes in the blood, the lymphocytes falling very greatly in number, while the polymorphs rise. I have made 58 differential leucocyte counts on 25 patients while on the diet free from fat-soluble vitamin A and seven on three similar patients on ordinary diet. All the counts were within the normal limits of variation, and in none was there any deficiency of lymphocytes. It appears, therefore, that the effect reported on rats and mice is not due to lack of this vitamin, but to one or both of the others, or that the effect of vitamin-free diet upon an adult human being differs from that upon these rodents.

(5) No bony changes (other than some secondary deposits) were discovered in any of these patients.

(6) No ill-effects of any kind were observed, and it can confidently be stated that although the use of a diet free from the fat-soluble vitamin A exerts no apparent specific effect upon an adult woman, its use is absolutely safe and fraught with no danger whatever to the patient.

Finally, although it must be admitted that the results of this experiment are almost entirely negative, they yet leave a loophole of hope for certain cases, and it might be well worth while to try the effect of this diet upon patients in whom the growth while of small size and not extensively infiltrating is yet inoperable on account of its situation ; or when the growth is small and in itself operable, but the patient refuses operation or cannot be submitted to it by reason of the general condition (e.g., a cardiac lesion). The former type of case is, however, rare, and the latter, as already stated, will practically never consent to remain in a hospital.

SOME UNUSUAL CAUSES OF DIFFICULTY OF MICTURITION

DUE TO ABNORMAL CONDITIONS AT THE VESICAL NECK.

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FOR normal micturition the urethra must be patent, and there must be relaxation of the sphincters accompanied by contraction of the detrusors of the vesical wall. Difficulty of micturition may therefore be either *obstructive*, due to an obstacle in the canal, or *non-obstructive*, due to some interference with the normal detrusor action. The coördination between the sphincteric and detrusor action should be perfect. If the sphincteric contraction be relatively in excess of the detrusor action there will be difficulty of micturition.

In this paper I propose to discuss briefly three unusual causes of difficulty, due to narrowing of the canal at the vesical neck, which give rise to many of the symptoms of enlarged prostate without any enlargement, and between which, owing to the comparative absence of physical signs, it is often hard to differentiate in diagnosis.

1. *Small Fibrous Prostate.*

In an advanced case of small fibrous prostate the gland is transformed into a mass of fibrous tissue,

[3] THE LANCET, 1921, i., 963.

practically no glandular cells being seen on microscopical examination. Calculi, tuberculous disease, and abscess are predisposing causes. The symptoms are usually very similar to those of glandular hyperplasia; frequency of micturition is often the most prominent, and is equally great night and day, except for a period of immunity for the first four or five hours of recumbency. Infection of the bladder causes a great increase in frequency; the patient no longer enjoys the period of immunity referred to. Difficult micturition is usually more marked than in glandular hyperplasia; in this way the small fibrous prostate resembles a malignant prostate. The stream is usually small, and may be a mere dribble. In the early stages there is often no residual urine; later there is usually a large quantity. The length of the urethra may be diminished. On rectal examination, which is the most important means of arriving at a diagnosis, the gland, smaller than normal, may not even be palpable. In scirrhous carcinoma of the prostate, with which the condition is liable to be confused, the gland is fixed and there is not likely to be that uniform smoothness usually present in small fibrous prostate. In the later stages the presence of secondary or metastatic growths will clinch the diagnosis.

Treatment.—When the patient comes under observation the condition is, as a rule, too far advanced to expect any good results from the removal of the cause, such as calculi. The passage of large metal bougies may be tried, but, as in cases of urethral stricture with extensive formation of fibrous tissue, the results are not lasting. Some surgeons prefer to do a perineal prostatectomy, others very much favour perineal prostatotomy.

2. *Congenital Valves of the Prostatic Urethra.*

These consist of folds of the urethral mucous membrane; the different types have been fully described by Young of Baltimore. The valves are said always to have their concave surfaces directed towards the bladder, so that they cause obstruction during micturition, but do not impede the passage of instruments from without. It may, however, be pointed out that if the concave surfaces are directed towards the meatus no symptoms are likely to occur, and the presence of the valves will probably pass undetected. The condition is characterised by difficult micturition from infancy; this may result in retention with overflow which may be mistaken for the ordinary enuresis of childhood. In less severe cases there may be a history of a very small stream and frequency of micturition.

Treatment.—Dilatation by metal or gum-elastic bougies should be tried; in some cases an internal urethrotomy may be done, but probably removal of the valve with the cautery, scissors, or finger by the suprapubic route will give the best results.

3. *Spasm of the Internal Sphincter.*

While atony of the bladder is undoubtedly a common enough condition in old people and in patients suffering from various nervous lesions, I am inclined to think that a large proportion of the cases described as atony of the bladder in healthy young males are in reality due to excessive action of the vesical sphincter. Probably there is a persistence into adult life of a congenital hypertonic condition of the internal sphincter—at first of such a slight degree as to be compensated for by a little extra detrusor effort; later the spasm or contraction of the sphincter is increased and the difficulty becomes much greater, and retention may supervene. Such a condition would appear to be analogous, at least in some ways, to hypertrophic stenosis of the pylorus in children. In such cases there is no history of gonorrhœa, and nothing to suggest commencing spinal disease, while on physical examination there is no abnormality of the prostate—nothing, in fact, to suggest old inflammatory trouble. On passing a sound obstruction is sometimes met at the position of the internal sphincter. The symptoms in many ways resemble those present in patients suffering from small fibrous prostate or congenital valves of the prostatic urethra, but the clinical history and age of the patient will help in the differential diagnosis.

Treatment.—This should be by the passage of metal bougies, followed by the introduction of a Kollmann's dilator, so that the dilating part lies within the internal sphincter. I dilate up to 30 or 35 mm. on the first occasion and up to 40 or 45 mm. on subsequent occasions. In some cases an anæsthetic may be necessary. The treatment is as a rule satisfactory.

In conclusion, I should like to emphasise the great importance of thorough examination and early appropriate treatment, as these cases, through being wrongly diagnosed and imperfectly treated, may, from back pressure on the kidneys, develop hydronephrosis and renal inefficiency, and pass from the possibly curable to the incurable stage.

THE USE OF PHENOL RED AS AN INDICATOR

FOR MILK AND SUGAR MEDIA.

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ALTHOUGH litmus has for many years been the indicator most commonly used to demonstrate acid or alkali production in bacterial cultures there are few bacteriologists, especially in the tropics, who have not, at some time or another, experienced difficulty with this reagent. Numerous formulæ have been suggested to obtain a litmus solution which is constant and reliable, but, as McIntosh[1] has pointed out, none of the various formulæ tried have proved very satisfactory. This observer describes the preparation of a litmus solution which is probably by far the most reliable method which we possess. Compared with the new indicators which have come into general use during the last few years litmus is comparatively insensitive; for instance, the range of litmus is from pH 5–8, which is nearly twice as great as the sulphone-phthalein indicators, as for example, phenol red, which has a range of pH 6·8–8·4. As regard the preparation of phenol-red milk, as a substitute for litmus milk, the procedure is very simple, especially if condensed milk is used; as the latter is obtainable all over the world, and more or less constant in composition, it may be as well to describe the technique when using this form of milk.

Preparation of Phenol-Red Milk.

One part of "Ideal" milk is taken and added to four parts of tap-water; to 5 c.cm. of this a few drops of phenol-red solution are added, and then N/10 NaOH is run in until the mixture is brick-red in colour, then the calculated amount of N/1 NaOH is added to the diluted milk in bulk and sufficient saturated aqueous solution of phenol red to make the milk a vivid brick-red; provided that care is taken to stop the addition of alkali when the brick-red colour is reached corresponding to a pH of approximately 7·5 the subsequent production of acid or alkali by an organism in this medium will be clearly demonstrated. The medium is then tubed and steamed for 20 minutes on three successive days. Such a medium shows changes in reaction in a much more vivid manner than does litmus milk, and the production of an initial acidity, which is followed by alkalinity, as in the case of *B. paratyphosus* B, is well demonstrated.

As regards the use of phenol red instead of litmus as an indicator for sugar media the same arguments hold good, as owing to the increased sensitiveness of the former reagent small differences in reaction are more clearly shown. When the sugar reaction of *B. dysenteriæ*, Shiga-Kruse, is studied in a maltose-phenol-red peptone water I have found that there is

[1] British Journal of Experimental Pathology, 1920, vol. i., p. 70.

an initial acidity produced. This occurred in all of the five strains of this organism which I tried and in three samples of maltose.

Courtland S. Mudge[2] has shown that heating in streaming steam for three successive days in the Arnold steriliser seems to hydrolyse maltose more than heating in the autoclave at 15 pounds for 15 minutes. I have tried various methods of sterilising the three samples of maltose, but still find that all the five strains of *B. dysenteriæ*, Shiga-Kruse, produce an initial acidity; moreover some strains of this organism appear to consistently produce more acid in this medium than do other strains, and the initial acid production is of longer duration. I am informed by Dr. J. T. Duncan, of the London School of Tropical Medicine, that he has found this indicator very useful in detecting small changes in the reaction of cultures of different yeasts—changes he had been unable to demonstrate with litmus.

This method is not, of course, meant to be one by which the terminal hydrogen-ion concentration of a bacterial culture can be definitely ascertained, but owing to the vivid alterations in colour and the ease of preparation it is hoped that it may solve some of the difficulties which are, from time to time, met with when using litmus.

Clinical Notes:
MEDICAL, SURGICAL, OBSTETRICAL, AND THERAPEUTICAL.

INFLUENZA, PREGNANCY, AND EMPHYSEMA.

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LIEUT.-COLONEL, R.A.M.C. (RET.).

I HAVE never met with general emphysema of connective tissue, except as a complication of fractured ribs, during nearly 50 years of medical and surgical work—25 years in the British army, including charge of hospitals for soldiers' wives at home and abroad, and the remainder in civil life. Whether such cases are common or not I do not know, as the literature on the subject is not available: but in view of my own experience over such a long period without encountering them, this particular case may be worth recording.

On the night of Jan. 5th last I was asked to see Mrs. X., aged 22. She was in bed and had been ill with influenza for some days; temp. 103° F., pulse 120, resp. 40; frequent vomiting, and great pain over the lower abdomen. She was pregnant about eight months, I.-para, but not in labour. I considered her dangerously ill and so informed her husband and mother. There were congestion of bases of both lungs and a condition really of broncho-pneumonia. The vomiting was very distressing, and cough and expectoration incessant, the sputa being blood-streaked. An effervescing mixture with acid. hydrocy. dil. and a large sinapism to epigastrium relieved the vomiting. On the 7th temp. 101° F., pulse 120, resp. 60. She could not take carbonate of ammonium, so I gave her sp. amm. arom. with sp. chlorof., tinct. camph. co., ℥ x.; vin. ipecac. with tinct. strophanth. ℥ iv. three-hourly, the heart sounds being weak and dyspnœa troublesome. Insomnia also very troublesome; she complained much of frontal headache and myalgia of abdominal muscles due to incessant coughing; these were relieved by aspirin gr. x. at intervals. On the 14th, at 11 P.M., the husband called to tell me patient was very restless and struggling with the attendants and that she was kept in bed with difficulty. Veronal gr. v. ordered.

At 8 A.M. on the 15th I received an urgent request for help from the village midwife and on arrival found a breech birth with retention of head. The latter was quickly released by the Smellie grip; the child was stillborn. On the 17th my attention was called to a swollen condition of the face and right eye-lids. Urine non-albuminous. Temp. normal, pulse 120, resp. 40, but condition of lungs improved. Up to date the stimulating expectorant with tinct. strophanthus had been continued four-hourly. On the 18th the right eye was quite closed, the lids being enormously swollen, also the face, forehead, neck, and chest. Orthopnœa urgent and the sitting position in bed only tolerated. On the 19th the emphysema had extended to both arms and backs of hands, the abdomen and back, the peculiar crackling being marked and evident on touch. Her condition was grave owing to cardiac weakness and dyspnœa, and I asked Dr. Morton Mackenzie, of Dorking, to see her. The result of the consultation was that we continued the general and medical treatment, the diet being chiefly milk, Benger's food, Brand's essence, and brandy ℥ ii. two-hourly.

The condition of lungs gradually improved, and patient was practically convalescent on Jan. 28th, though the emphysema was still apparent over arms, hands, and chest, but had quite disappeared from the face.

No doubt on the night of the 14th the restlessness and struggling were due to labour-pains, and presumably during the forced expiration air had escaped into the posterior mediastinum and so into the neck and other parts. It was so extensive and marked that the patient's normally thin features and body were transformed into those of a fat-faced and corpulent person, which made her for the time quite unrecognisable. The process of absorption was slow and practically completed by the end of January.

[2] Journal of Bacteriology, 1917, p. 403.

A CASE OF POST-DIPHTHERITIC FACIAL PARALYSIS OF LATE ONSET.

BY EUSTACE THORP, O.B.E., L.R.C.S., D.P.H.,
ASSISTANT M.O.H., SUNDERLAND.

FACIAL paralysis following diphtheria is very rare and in this case the late onset—six months after the attack of diphtheria—is of interest.

Nurse S., in attendance on diphtheria cases, developed the disease on Sept. 16th, 1921. On the same evening 10,000 units of antitoxin were given, followed next morning by a further dose of 6000 units. The disease ran an uncomplicated course and seven weeks later, after convalescence and sick-leave, she returned to duty. On March 7th, 1922, she reported to me as she had been told that her face was twisted, and she told me that she had noticed that her lips did not move properly. I found a well-marked paresis of the muscles of the right cheek and eyelid and there was some difficulty in speaking. Some loss of taste. She complained of diplopia in each eye separately. After four weeks her face returned to normal. The diagnosis made was post-diphtheritic paralysis.

A WANDERING SILK SUTURE REMOVED FROM THE URETHRA AS A SEQUEL TO CÆSAREAN SECTION.[1]

BY GORDON LUKER, M.D. CAMB., F.R.C.S. EDIN.

THE following case raises the point as to whether silk should be employed to suture the uterus when the lower segment incision is employed.

History.—S. S., a married woman, aged 34, was admitted to the London Hospital on May 22nd, 1921, at full term with a generally contracted pelvis. She had had two previous children by Cæsarean section, the second in June, 1916. Labour-pains started on May 23rd, and Cæsarean section was performed forthwith.

Operation.—The uterus was opened by a longitudinal incision through the lower uterine segment, and a 9½ lb. living male child extracted. The uterine incision was closed by (1) a continuous silk suture to the deeper muscular layers; this was buried by (2) a continuous chromic catgut suture to the superficial part of the wound. The puerperium was afebrile. At the patient's request she was sterilised by excision of a portion of each Fallopian tube. She made an uninterrupted recovery and was discharged from hospital on June 12th.

On Jan. 7th, 1922, she returned to hospital complaining that "some sort of thread was hanging down" from the vulva. On examination about 3 inches of silk suture was seen to be protruding from the urethra—obviously the buried suture, from the lower uterine segment, which had wandered into the bladder. The suture still retained some attachment within the bladder. The free portion was therefore cut off.

The patient complained of no symptoms and was therefore discharged, and told to report if the remaining portion of silk suture appeared.

[1] A communication made to the Section of Obstetrics and Gynæcology, Royal Society of Medicine, March 2nd, 1922.

Medical Societies.

SOCIETY OF MEDICAL OFFICERS OF HEALTH.

NAVAL, MILITARY, AND AIR FORCE GROUP.

A MEETING of this group was held at 1, Upper Montague-street, London, W.C., on April 7th, Major-General Sir W. G. MACPHERSON being in the chair, when Prof. S. LYLE CUMMINS opened a discussion on

TUBERCULOSIS AS A DISEASE OF THE SERVICES.

After pointing out that the population included in the Services is, so far as regards tuberculosis, a selected population, weeded out by careful medical examination before admission, kept free from infective individuals by the invaliding of diagnosed cases during service, living under conditions of housing, food, clothing, work, amusement, and discipline that all tend to favour health, Prof. Cummins went on to say:—

It is true that the age-periods of service are those of the maximum tuberculosis mortality in civil life; but the unfavourable conditions that are held responsible for this mortality should be largely absent during military service, at least in peace time, while the life of a sailor is of a sort that might be expected to keep men free from this disease. There are, however, certain factors which may, perhaps, tend in an especial degree to lead to a raised tuberculosis incidence.

Incidence of Tuberculosis in the Services and Civilian Population Compared.

It will be some time before we can get our statistics back to normal owing to the expansion of the Services for war and their deflation for peace; and so it is only possible to quote pre-war figures. Curves of invaliding and mortality for the navy were published by Sir W. W. Pryn, R.N., in 1908, while, through the kindness of Surg. Rear-Admiral Sir P. Bassett-Smith I have been enabled to complete the record up to 1914. Similar curves for the army have been placed on record by Sir Alfred Keogh and by Colonel C. H. Melville; and I have to thank Colonel D. Harvey for furnishing me with data to complete the curves to 1914.

In both Services there has been a steady and continuous fall, both in mortality and invaliding to a point which, on the charts, looks like vanishing point. That is one of the dangers of curves. Mortality rates per thousand may be associated with extensive infection by tuberculosis even when they fall to less than 1. But it is clear that things have improved enormously since the "sixties." This great fall in the death-rate and the invaliding rate has, however, corresponded with a very similar fall in the death-rate of the civil population, and it may be assumed that a large part of the improvement noted in the navy and army must have been due to the operation of causes common to the rest of the community. This is not a reason for detracting from the successful efforts made by the medical services, as well as by the Royal Engineers and others, to improve the conditions of barrack life.

In 1914 it might have seemed reasonable to say that almost everything had been accomplished. But the acid test of war has proved that as long as tuberculosis remains a disease of the civil population, so long will it deserve the earnest attention of the fighting services. The regular services are but the bony skeleton; the muscles and nerves of our battle-line are in the workshops and factories, the mines, and the quarries of England.

Turning to consider the factors that may tend in an especial degree to influence unfavourably the prevalence of tuberculosis in the Services, a preliminary list will include, as the principal items, aggregation in barracks or in ships; effects of climate; effects of active service; effects of wounds, especially wounds of the chest; and several other factors more or less peculiar to the Services. But before we attempt to consider these points, we must face a few preliminary questions.

Of prime importance is the question whether the *tuberculosis that we meet with in the soldier or sailor has been contracted during service or merely reactivated by service conditions.* In the opinion of many high authorities, nearly all adult tuberculosis is due to the reactivation of old infection. M. Fishberg makes the following statement: "Phthisis is a disease occurring in persons who have been infected with tubercle bacilli many years before the outbreak of disease." . . . "Exogenic infection is exceedingly rare, if at all possible." Colonel R. J. S. Simpson, on the other hand, expresses the following opinion—a very rash one, I think: "Tuberculosis in the army is chiefly the result of infection after enlistment; the number of cases in which the infection is latent at the time of enlistment and develops later is comparatively small." This point I regard as of fundamental importance and I shall attempt to examine it carefully.

Infection Without Clinical Signs.

To begin with, what evidence have we that the British soldier is or is not infected with tuberculosis while still free from the clinical signs of the disease?

1. *Tuberculin tests.*—There is not much evidence on record as to the tuberculin reactions of British troops. In 1909 I carried out a series of tests by the Pirquet technique with old tuberculin in groups of tuberculous and clinically non-tuberculous patients, with the result that I found 75 per cent. of positives to 5 per cent. in the non-tuberculous group. Now we know for certain, through the researches of Baldwin and of Zinnser, that the tuberculin test when positive proves actual infection with the tubercle bacillus; and I therefore feel justified in concluding that 75 per cent. of the clinically non-tuberculous patients examined by me were actually infected.

2. *Post-mortem examinations.*—E. L. Opie, while engaged in an inquiry as to infection of the mesenteric glands with tubercle, had an opportunity of examining the cadavers of 66 British soldiers who died of other diseases in France during the war. He found mesenteric gland infection in 18, or 27 per cent.

3. *The infectibility of British troops*, as compared to troops of other races, in face of equivalent exposure to tuberculosis. We owe to a host of competent workers, notably Römer and Hamburger before the war, and Calmette, Soper, Paterson, and Baldwin in more recent publications, the knowledge that animals already infected with tubercle bacilli are relatively difficult to reinfect with the same organism. The relative infectibility of different racial groups under comparable conditions may therefore afford some indication of the existence in some of the groups of a high proportion of "previous infections."

Differing Racial Infectibility.

In a paper, read before the Society of Tropical Medicine and Hygiene in 1912, I called attention to the marked differences in infectibility of different racial units in India, Africa, the West Indies, and elsewhere, and suggested that these differences were to be accounted for by the previous exposure to sub-lethal infection of certain groups and absence of such infection in others. The late war afforded a singularly favourable opportunity to study this subject and, through the records kept by Major-General W. W. O. Beveridge, we are able to examine the relative susceptibility to tuberculosis of the various racial groups that took part in the operations in France and Flanders. It is just those racial groups that had lived their previous years far removed from industrial and urbanised conditions that showed the most marked degrees of susceptibility to infection. The careful clinical, post-mortem, and epidemiological investigations of Borrel, Roubier, and other French officers as to the tuberculosis of their colonial levies tells the same story.

We may conclude that the British army, while showing a high percentage of previous infection, evinces a marked power of resistance to acute and progressive tuberculous infections under active service conditions. But, while the information at our disposal indicates that certain races are more resistant than others, there is clear evidence that each race,

within its own type, shows a wide range of variation in resistance as between different age-groups, sex-groups, and occupational-groups; as well as between communities inhabiting different parts of the country. It is quite clear that, in such a community as the British army, drawing its recruits from both urban and rural areas, receiving into its ranks young adults from the north of Scotland, the west of Wales, and from the country districts of Ireland, and placing them for training, in close touch with lads from our big industrial towns, we should be unwise to rely too much on acquired resistance as a protection against infection.

Have we any evidence of differences between different types of recruit? Melville calls attention to the marked incidence and mortality rates amongst guardsmen at a time previous to 1876 when the A.M.D. reports gave incidence of disease by arms of the Service: quoting Roth and Lex to the effect that the same prevalence was noted amongst the guards regiments in Berlin and Paris. To explain it he says: "It is almost certain that this increased liability to tubercle was due to the heavier amount of ceremonial guard duty required of these troops." It would seem that explanations on similar lines had been suggested before. Thus, Villemin, the discoverer of the infective nature of tuberculosis, says, in speaking of this liability of guards regiments to tuberculosis: "On invoque généralement mille raisons pour expliquer cette mortalité considérable. Ce sont les buffleteries qui leur compriment la poitrine, c'est leur service qui consiste a monter des gardes. . . ." Villemin, with the facts before him, which he had himself established by animal experiment, was dissatisfied with explanations of this kind and attempted to look more closely into the matter. He had already noted the close similarities between glanders and tuberculosis. Examining the tuberculosis amongst the guards regiments, he finds that the incidence rises with each year of service. Then he notes that the same thing happens with the cavalry chargers as regards incidence of glanders. What is the clue?

Not Extra Guards or Ceremonials but Infection.

Why, then, should the guards suffer more than the line regiments? Villemin had before him the figures for the British army of his time, showing a mortality of 12·5 per cent. in the guards, as compared with 8 per cent. in regiments of the line. Because, he thinks, of the fact that the guards are stationed in densely populated capitals where exposure to infection is concentrated. We would add another factor; the recruitment of these fine young soldiers from the rural areas where the physical type needed for guards units is most easily found. The Scots Guards, the Irish Guards, the Welsh Guards—the very names are enough to remind us that the men come from the remote country places where infection is either absent or massive: absent until introduced from without, massive because associated with small and ill-ventilated homesteads, where the chances of acquiring resistance through sub-lethal infections is small—just those countries in which Brownlee has demonstrated the prevalence of the "young adult" type of mortality which is always associated with an absence of acquired resistance to the disease.

We find in this susceptibility that used to be so marked in the household troops reason to think that the risks of infection after enlistment cannot be ignored. But, while laying stress on this point, I am not at all disposed to accept Colonel Simpson's opinion that "tuberculosis in the army is chiefly the result of infection after enlistment." We must bear in mind that while a proportion of our recruits come from rural areas, most of our soldiers are drawn from the industrialised populations of our great cities, where the proportion of latent infections must be high and the average level of acquired resistance presumably good.

Again, the source of infection of the massive and dangerous type must be very few in army life. Careful physical examination on entrance weeds out the diagnosable and dangerous open cases. All men that develop the disease are promptly invalided. There is no serious overcrowding in modern barracks. Under these circumstances the danger of fresh exogenic infection must be small.

The real danger is fresh infection from within; the *auto-reinfection* always possible in those whose tissues harbour foci of latent tuberculous infection. If it is admitted that this tendency to the development of tuberculous infection, latent at the time of enlistment, is the chief danger for the British soldier, it becomes a matter of great importance to inquire what are the circumstances in military life that are likely to determine the development into activity of these latent foci.

Conditions which Reactivate Pulmonary Disease.

Pulmonary disease might conceivably be reactivated by chest wounds, climate, and war conditions.

Chest wounds.—The late war afforded a great opportunity for collecting information on this point, and though the regrettable want of adequate machinery for amassing "vital statistics" was responsible for much loss of invaluable knowledge, several competent individual workers kept records which are now available. These records suffice to show that chest wounds are unimportant in evoking latent tuberculosis. The work of Léon Bernard and Ch. Mantoux, of E. Sergent and of J. B. McDougall, all goes to prove that, unless the projectiles passes through the old lesion itself, penetrating chest wounds have little or no action in awakening latent tuberculous disease. Gas wounds, too, are of but little danger in this respect. Extensive contusions of the chest, however, are liable to be much more serious and are often followed by acute generalisation of tuberculous infection.

Climate.—On no phase of the tuberculosis problem does greater confusion exist than upon the influence of climate in this disease. Persons who develop tuberculosis in England are advised to go to Egypt; those who develop it in Cairo are sent home to Europe. We are told that sunlight is the one outstanding remedy and preventive of the disease, and yet we see patients go down hill rapidly in the Punjab or in the Sudan. Has the army no lesson for us?

The army presents us with the picture of a collection of healthy young men, well-fed, well cared-for, and well provided with medical supervision and aid, leaving the temperate climate of this country for every possible variety of climate that the earth can produce. Surely, under these conditions, the effects of climate, if at all important, should be reflected in wide variations in the incidence and mortality from tuberculosis. Those interested in the subject should turn to the careful analysis of army records by Colonel Simpson, who concludes that climate has less effect on this disease than on any other of the important diseases of military service. All that can be said is that, as a general rule, "the more trying the climate, and the more prevalent other diseases, the higher the incidence of tuberculosis." This is merely to say that bad physiological environment anywhere leads to an increase of recognisable cases of this disease.

War conditions.—So far as concerns the actual incidence and mortality during the period of active service at the front tuberculosis is almost a negligible disease. Nevertheless, I am of opinion that no disease is of greater military significance for long drawn-out operations on a large scale, where man-power is a matter of vital importance. The ictus of tuberculosis on the army is to be found not in the records of the actual theatre of war but in the terrible additions to the pension-list; the loss of working capacity after demobilisation, the suffering misery and loss of efficiency that result from the strain of war service, and the reaction of peace.

At a rough estimate based on very incomplete figures, it may be estimated that about 6000 pensions were granted for tuberculosis as the result of the war by the end of March, 1921; and the number has since been added to, and is not yet complete. It is probable

that about one man in every hundred of those who served during the war came to manifest tuberculous disease during or after his time in the army. These considerations will, I think, justify me in saying that tuberculosis is a problem worthy of much more attention as a service disease than it usually comes in for.

We tend to shunt it on to the civil death-rate and, because we are not much embarrassed by it during peace, are only too ready to forget that it may matter very seriously in war.

Prof. Cummins concluded by expressing his view that to suggest setting up special army sanatoriums would be absurd, the principle of getting rid of army cases was undoubtedly the right one. But what might be done, and is not done, is to make full use of the wonderful research material that the army provides.

Discussion.

Major-General BEVERIDGE, Lieutenant-Colonel SYLVESTER BRADLEY, and Dr. A. T. NANKIVELL joined in the discussion, after which Sir W. G. MACPHERSON summed up from the chair. Prof. CUMMINS, in replying, advocated the use of Dreyer's standards of physical development in doubtful enlistment cases.

ROYAL SOCIETY OF MEDICINE.

SECTION OF TROPICAL DISEASES AND PARASITOLOGY.

AT a meeting of this section of the Royal Society of Medicine, over which Sir LEONARD ROGERS presided on April 3rd, the following communications were made.

Subtertian Malaria Reported as Yellow Fever.

Colonel E. WILKINSON, I.M.S., gave an account of two cases of subtertian malaria in England in 1920, the nature of which so far resembled yellow fever as to lead to their notification on suspicion. As such, they were the first to be reported in this country since the remarkable outbreak of yellow fever at Swansea in 1865. The patients in each case were members of ships' crews coming from the West African coast, the one from Bathurst, British Gambia, in January, the other from Dakar, French Senegal, in November, 1920—ports where no cases of yellow fever had occurred at all recently, and at which, owing to prevalence of malaria and abundance of mosquitoes, landing was not permitted to the crews of either ship. The first case had been taken ill 11 days after leaving Bathurst, with vomiting, jaundice, and slight fever, and was landed at Dover on the fourth day of illness, all but moribund. His temperature rose to 107° F. He became comatose and died in hospital the day after admission. Post-mortem examination failed to support the provisional diagnosis of yellow fever, and parasites of subtertian malaria were found in films from the spleen. In the second case, when a few days out of Dakar, the patient was seized with headache, rigor, and vomiting. He developed jaundice and remained in a weak state till he was landed at Swansea and removed to hospital, where he was regarded as a possible case of yellow fever. On examination, however, his general condition pointed to malaria as a more probable diagnosis, although his blood failed to show any parasites. A few days later the development of a bubo in the right groin proved an unexpected complication and raised the question of plague infection. Incision into the suppurating gland allowed the escape of a small quantity of pus, from which a staphylococcus and a bipolar bacillus, resembling *B. pestis*, were obtained. Subcultures of the organism, however, and animal tests failed to bear out the resemblance, and the bacillus was regarded as probably belonging to the Salmonella group. Further inquiry quite failed to trace any possible contact with plague, either at Dakar, on board ship, or after landing. Moreover, explanation of the bubo was found in imperfectly healed scars of boils on the legs. The patient recovered and three weeks later had a typical attack of malaria, during which subtertian parasites were found in his blood. The two cases were fully investigated by Colonel Wilkinson and Colonel S. P. James, representing the Ministry of Health. Their inquiries on board both vessels elicited a history of other cases of "fever" during the respective voyages, attended by a death on each ship; but the finding of subtertian parasites in several members of the crew supported the ultimate diagnosis of malaria, as the real cause of the illness which had been reported as yellow fever. Colonel Wilkinson commented on the risk of Europeans contracting malaria in ships calling at West African ports, even though no landing was made, due presumably to infected anopheles being able to reach vessels at their anchorage through boat communication with the shore.

Yellow Fever at Swansea in 1865.

Colonel Wilkinson drew attention to the coincidence that one of the two suspect cases of yellow fever, the first to be reported in England since 1865, should have been at Swansea. He therefore felt that a brief account derived from the late Sir George Buchanan's very complete official report of the outbreak in 1865 would be of interest. The barque *Hecla* arrived at Swansea on Sept. 9th, 1865, coming direct from Cuba, where yellow fever was epidemic. Though three of the crew were taken ill with "fever" and died on the voyage, and another on arrival in port was incapacitated with so-called "dropsy," the captain of the ship quite ignored all possibility of infection and made no report to the authorities. The passengers and crew dispersed, but the sick member, who was also landed, died the same day, and the cause of death was certified as yellow fever. Thereupon the port and sanitary authorities took every step to arrest the unloading of cargo from the *Hecla*, to disinfect the ship and its contents, and to prevent further communication with the town. On Sept. 15th, the sixth day after the ship's arrival, a case of yellow fever occurred in a resident who had visited the ship. From this date up to Oct. 4th, 29 cases in all of genuine or suspected yellow fever developed, followed by 16 deaths, among residents or those employed at work within a radius of 200 yards of the *Hecla's* mooring place. They included three of the crew of the smack *Eleanor* which had left her moorings near the *Hecla* on Sept. 18th and sailed to Llanelly, where the men were taken ill on the 24th and one had died. It was noteworthy that no further cases were reported among either passengers or crew of the *Hecla*, after their leaving the ship. A plan of the harbour was shown giving the position of the *Hecla* and *Eleanor*, and the distribution of cases of yellow fever which occurred in the vicinity.

Treatment of Kala-azar by Stibenyl.

A report by Dr. L. E. NAPIER was read by the PRESIDENT on ten cases of kala-azar in India, which had been treated with injections of stibenyl (sodium acetyl para-aminophenyl-stibiate). Although good results had originally been claimed by some, who had first used this preparation of antimony in 1916, and by others again in 1920, more recent experience had shown that considerable risk attended its use, that serious symptoms with diarrhœa and collapse were not uncommon after the first few doses, and that where a full course was possible a permanent cure was not effected. The reputed advantages of stibenyl were its applicability in larger doses and with less toxic results than in the case of the sodium antimony tartrate. Dr. Napier had, however, met with little success in its application to the ten cases he described In the majority, after the fourth injection, vomiting, diarrhœa, and collapse occurred; three cases had died, two were described as "apparent cures," one as "improved," and in four treatment was abandoned in favour of sodium antimony tartrate, which gave more reliable results. The total amount of stibenyl given by intramuscular injection varied from 2·25 to 3·25 g. spread over 9 to 12 injections, given every

other day, commencing with 0·05 g. increasing to 0·1, 0·15, &c., until the full amount had been injected. Even though given in such small doses, compared with the other sodium salt, the disastrous consequences of stibenyl were anything but encouraging as a short-cut method of treatment, though well within the margin of safety of the prescribed dosage. Dr. Napier had found the use of stibenyl to give rise to much pain, and occasionally to tissue-necrosis at the seat of injection. He suggested that the serious symptoms following its administration were possibly due either to plasmolytic action setting free foreign toxic protein, or to the cumulative effect of the antimony in a preparation less readily disposed of than the simpler salt, or to changes which the drug, one of complicated structure, had undergone in the course of transit.

Dr. ARTHUR POWELL stated that Dr. Dalal's experiences in the use of stibenyl in Bombay had been very similar to those of Dr. Napier. Later doses in the course of treatment gave rise to vomiting and purging. The drug possessed no advantage, in fact the reverse, over the NaSb tartrate; and Dr. J. B. Christopherson, he added, had found stibenyl to possess but little parasiticidal action.

The PRESIDENT said that a reliable intramuscular method was wanted—possibly if sodium antimony tartrate could be obtained in a pure state it could be given intramuscularly without pain. Much success had attended the use of the NaSb tartrate by intravenous injection to kala-azar patients at Budwallah in Assam, and there were said to be no cases now within 20 miles of the hospital there.

Sparganum in Man in Africa.

Prof. R. T. LEIPER showed a specimen of sparganum, the larval stage of a cestode belonging to the family Dibothriocephalidæ. The specimen measured 7½ inches in length, and had been removed by Dr. E. C. Girling from the tissues underlying the external oblique muscle of a patient, operated on for hernia in the Belgian Congo. The only other instance of sparganum occurring in man in Africa, from a patient in German East Africa, had been recorded and named by Sambon as *Sp. baxteri*, probably the immature larval stage of the dibothriocephalus, which had been found in large numbers in the African leopard as the parent host, but was not known to occur in the dog in Africa. On the other hand, in the East, where *Sp. mansoni* was not uncommon, the adult host of *Dib. mansoni* was invariably the dog. Prof. Leiper regarded *Sp. baxteri* and *Sp. mansoni* as immature stages of two probably distinct varieties of adult dibothriocephalus, the one normally parasitic in the leopard in Africa, the other in the dog in the East. He thought that the sparganum shown at the meeting probably belonged to the former species (*Sp. baxteri*).

Nomenclature of Certain Helminth Parasites in Man.—Prof. Leiper quoted examples of incorrect nomenclature, which had appeared in successive text-books on helminthology, without verification as to their accuracy. 1. *Hamularia lymphatica* had been repeatedly, but erroneously, described as *Filaria equinum*, belonging to the family *Setaria equinum*; whereas the two were distinct species of filaria, differing anatomically; the one parasitic only to man, the other to the horse. *H. lymphatica* somewhat resembled *F. conjunctivæ*, male and female specimens of which had recently been described by Forbes in two cases in Macedonia, but the former was considerably shorter, measuring only 26 mm. Prof. Leiper was able to show his authority for correcting the mistaken identity of the filaria, in an old volume which had recently come into his hands, entitled "Observationes pathologico-anatomicæ Auctarium ad Helminthologiam Humani corporis continentes," Lipsiæ (? Leipzig), 1793, by F. Treutler. The filaria, there described for the first time, was named by the author *Hamularia lymphatica*, from its supposed hooked head, but probably it was the tail with its spicules which suggested the hook or hamus. The book contained well-executed plates showing the appearance of the filaria and its typical distribution in great masses in the lymphatic glands about each bronchus of its human host. It was for lack of this original description that in successive text-books the parasite had been mistaken for *F. equinum*. 2. The common fluke, so-called *Metagonimus yokogawai*, should by right of priority be known as *Loxotrema ovatum*, having been originally so named and described in the cat by Kobayashi many years before its discovery in man by Yokogawai, who had ignored the much earlier authentic account. Prof. Leiper described this fluke as occurring also in dogs, and in the encysted cercarial stage in fresh-water fish, the probable source of the adult fluke in man, cats, and dogs. 3. A small dibothriocephalus occurring only in man and not in animals had been separately described as belonging to three different species, as the result in each instance of the examination of a single fragment of the whole worm—thus, as found in Syria, it had been named *Dib. parvus* (Stephens, 1911); in Russian Siberia, Lake Baikal, *Dib. minor* (Chokowsky, 1916); and in Roumania, *Tænioides* (Leon, 1920). It was probable, however, that the three specimens belonged to a single, hitherto undefined and unnamed, species of dibothriocephalus.

The Earliest Account of Pellagra in Egypt.

Dr. M. KHALIL in his paper revived a long-forgotten publication by an Arabian physician, Ahmed Ibu Hassan El Rassidy, to whom credit was due for the earliest description of pellagra in Egypt, which had appeared in the first volume of "Diseases of the Skin," Cairo, 1846. Pellagra, though first described in Spain in 1735 by Casal, who published his account in 1762 under the title of "Mal de la rosa," was probably recognised so far back as 1578 in the health regulations of Milan, as "pellarella." In Italy, Frapolli in 1771 first named the disease "pelagra," synonymous with the "Alpine Scurvy" described by Odoardi in 1776. Its recognition in France followed, in 1818, in an account by Hameau of cases occurring in the plain of Arcachon, published in 1829. In Egypt, however, priority of description of the first occurrence of the disease there had hitherto been given in all text-books to Pruner in his "Topographie Médicale du Caire," in 1847, whereas that review had been preceded and possibly inspired by Ibu Hassan's original account published in the previous year. Dr. Khalil quoted in detail from the Arabian author's report of the disease, under its various synonyms, characterised by an erythematous condition of the skin, which might become scaly and bullous, or by the development of nerve lesions without evidence of skin eruption. It was mentioned as common amongst the poor, and known as a poverty disease associated with the eating of maize, under-feeding, exposure to sun, and insanitary conditions. The treatment advocated was mainly dietetic and included attention to improved hygiene and housing, and avoidance of sun exposure. No specific remedy was recognised, but the use of a seton, in the form of a pea under the skin, was advised, to act as a counter-irritant fixation abscess to draw out the circulating poison. Despite the lapse of time and the amount of modern research into the ætiology of pellagra, Ibu Hassan's account still stood, and deserved full recognition as a classic description of the disease.

The Transmission of Ascarid Infection from Snake to Mammal.

Dr. R. J. ORTLEPP (London School of Tropical Medicine) read a communication on the hatching and migration, in a mammalian, of larvæ of Ascarids normally parasitic in cold-blooded vertebrates. He quoted from the work of Stewart on the life-history of *Ascaris lumbricoides* in man and the experimental passage of its larvæ in guinea-pigs fed on the ova through the circulation to reach the pulmonary vessels and lung tissue. Dr. Ortlepp had succeeded in demonstrating experimentally a similar process of migration, applied to mice in the case of the *Ophidascarid filaria* and *Polydelphis attenuata* found

in the lungs of the Indian python, their normal host. The embryonated eggs of these ascarids had been given in food to mice, and subsequently the hatched-out larvæ had been found to make their way through the portal circulation to reach the liver and lungs of the animals so fed. Diarrhœa was provoked and the active larvæ and empty shells of the ova were found in the fæces; 48 hours after the experimental feeding the mice were killed. Autopsy revealed white and pink spots in the liver and lungs composed of masses of active larvæ. Sections also showed the larvæ lying among the liver cells and penetrating a portal vein. Fulleborn's observations were referred to, on the passage of ascarid larvæ through the circulation of mice, which had been fed on the ova of *Belascaris* and *Toxascaris*, normally parasitic in the dog. The encysted larvæ had subsequently been found in the liver, spleen, and kidney. Fulleborn had described experimental penetration of ascarid larvæ through the skin of mice and suggested that process as a possible mode of entrance, similar to the behaviour of the hookworm larva. So far, however, Dr. Ortlepp had not succeeded in verifying Fulleborn's experiment. He considered the passage of ascarid larvæ through the skin an unlikely path of infection, yet to be proved.

Prof. LEIPER regarded the results of Dr. Ortlepp's observations as unusually interesting and suggestive, in establishing by experimental feeding the larval infection of a warm-blooded animal, as a secondary host, through transference of ova from the normal cold-blooded host of the parent ascarid. He raised the possibility of a similar, but normal, parasitic relationship being found among birds and fishes.

CARDIFF MEDICAL SOCIETY.

A MEETING of this Society was held on April 11th, Dr. F. BUCKHAM in the chair.

Exhibition of Cases and Specimens.

Prof. E. EMRYS-ROBERTS and Dr. H. A. HAIG showed specimens and sections illustrating (1) a case admitted to hospital as one of acute abdomen, on March 13th, 1922. Pain radiated to the left testicle and there was violent vomiting; the symptoms abated somewhat, but laparotomy was decided upon and carried out on March 21st; no abdominal lesion was discovered. Shortly after vomiting restarted, becoming fæcal in character on April 1st. Death ensued three days later. At the autopsy the following sequence of events was recorded. On the auricular surface of the mitral valve were two elongated vegetations, each 1·5 cm. by 0·5 cm.; the left kidney was the seat of a recent infarct; coils of the jejunum had become fixed by adhesions to the laparotomy wound; and a volvulus of a portion of the gut, accompanied by great dilatation of the proximal end of the jejunum, together with the duodenum and stomach had supervened. (2) Carcinoma of the proximal end of the appendix, accompanied by great hypertrophy of the muscular coats of the viscus. The carcinomatous growth was limited to the base of the appendix, the cæcum not being invaded. Clinically, the symptoms resembled those of appendicitis. (3) An appendix removed at operation, subsequently fixed and bisected in the longitudinal mesial plane. It demonstrated the presence of an oval stercolith, 1 cm. by 0·5 cm., at a distance of 1 cm. from the tip. At its distal pole was a perforation, through which protruded a small accessory stercolith. The surrounding tissues showed acute inflammatory changes. (4) Consecutive sections of an epithelioma of the jaw during treating by radium. They showed increasing degenerative effects due to the action of the radium, and also showed the proteolytic action on the epitheliomatous tissues of the invading bacteria. In the earlier sections the tissues were infiltrated to a considerable degree by polymorphonuclear leucocytes; these had decreased and had almost disappeared in the most recent section.

Mr. GEARY GRANT read a paper on

Abdominal Emergencies.

He laid stress on the importance of a careful history and physical examination with such methods as X ray, cystoscopic examination, and differential leucocyte counts where circumstances and time permitted, but deprecated "deadly and scientific delay." The importance of attempting an approximate diagnosis was, first, to exclude an extra-abdominal condition simulating an acute abdomen. The case described previously, he said, by Prof. Emrys-Roberts illustrated this and showed that although an exploratory laparotomy is in many cases fairly free from risks it is not always so. Secondly, it was of great importance that the location of the lesion should, if possible, be determined in order that the incision made should give the best possible approach, the incision for removal of an appendix being unsuitable for dealing with a perforated gastric or duodenal ulcer. There were, moreover, several conditions outside the abdomen which mimicked the acute abdomen, and some which, whilst abdominal, did not require surgical treatment. Among abdominal emergencies Mr. Grant described a case of a man crushed between buffers where, on exploring the abdomen, a coil of proximal jejunum was found to be torn across for two-thirds of its circumference, with the mucous membrane protruding as a rosette, but without the escape of any intestinal contents; he instanced this as an example of protective sympathetic stimulation with inhibition of peristalsis and spasmodic closure of the pylorus, and of the possible duodenal sphincter described by Ochsner, Murphy, and Cannon, quoted by Langdon Brown. It was found by these observers that after high intestinal suture the pylorus remained tightly closed after recovery from anæsthesia for nearly six hours, the period of time required for primary sealing of the intestinal wound. In Mr. Grant's case, after repair of the intestine, the abdominal wound was closed without drainage and the patient recovered without any untoward symptoms. He described also a case of Sampson Handley's ileus duplex, and one of mesenteric thrombosis of 48 hours' duration where 2 ft. of bowel were found to be be gangrenous and were resected, the ends being closed and a lateral anastomosis performed. The patient died in 12 hours. He stated that such a measure should never be adopted, for the only chance for the patient was resection of the gangrenous gut widely, and the tying in of a Paul's tube at each end.

Mr. J. BERRY HAYCRAFT said that, in his experience, perforation of the small intestine generally produced the appearance of a rosette as described by Mr. Grant, but that single perforations, unaccompanied by crushing or other abdominal lesion, were usually associated with extravasation of fæces. In jejunal perforations there was more extravasation than in those of the lower ileum, and this was probably due to the thicker muscular wall of the jejunum contracting more actively than that of the ileum. In multiple severe injuries of the intestine and mesentery, on the other hand, complete paralysis often supervened; there was then no extravasation, the coil of injured gut lying beneath the wound, and the abdominal wall remaining flaccid, with slight tenderness over the damaged bowel, though the patient presented the general appearance of grave abdominal lesion. Paralytic ileus continued in many of these cases after resection.

SALARY OF MEDICAL OFFICER OF HEALTH FOR MANCHESTER.—The subcommittee of the Manchester Corporation has agreed upon a report on the question of the salary of the future medical officer. It is understood that it will recommend that the vacancy should be advertised upon terms, as to salary, which are likely to be regarded as an acceptable compromise by the British Medical Association and the Society of Medical Officers of Health, which bodies were recently in conference with the municipal authorities. The initial salary recommended will be £1700, rising by annual increments of £100 to £2000. The terms have still to be approved by the town council.

Reviews and Notices of Books.

NEURO-PATHOLOGY.

Pathology of the Nervous System. By E. FARQUHAR BUZZARD, M.D., F.R.C.P., Physician to St. Thomas's Hospital, &c.; and J. GODWIN GREENFIELD, M.D., M.R.C.P., Pathologist to the National Hospital for the Paralysed and Epileptic. London: Constable and Co. 1921. Pp. 334. 35*s*.

THIS text-book of neuropathology, written for medical students and practitioners, represents a praiseworthy attempt to fill an admitted lacuna in the neurological literature of this country, and as such is assured of a favourable reception. The authors' plan, indeed, includes more than the title of the volume indicates, for the ætiology, pathogenesis, and correlation of symptomatology with pathology, of many of the diseases therein described, are sketched clearly if briefly. It is no easy task to reduce to a concise yet sufficiently detailed compendium that large body of neuropathological doctrine derived by the working neurologist from personal cases, hospital experience and tradition, and monographs and articles scattered through the world's scientific literature. This task has been successfully accomplished by Dr. Buzzard and Dr. Greenfield.

On the whole, they give an account of neuropathology more morphological than exegetic; terminal states rather than pathogenic processes receive attention. In proportion to the space devoted to the former, the chapter on general pathology is relatively slight; and, while the main principles of pathological tissue-reaction are outlined, there is room here for a more comprehensive and at the same time more minute survey. Under the different headings of developmental and familial disease, neurosyphilis, infective disease, injuries, tumours, &c., the student will find excellent pathological descriptions, lucidly expressed, and perhaps it is in keeping with the authors' aim that such problems of interpretation as arise are relegated rather to the background. In motor neuron disease, for example, the relative pallor (by Weigert-Pal stains) of the whole of the white matter of the cord apart from that of the dorsal columns and cerebellar tracts, and the not infrequent involvement of certain sensory systems, are incidentally mentioned, but the significance of these peculiarities is not discussed; and puzzling phenomena such as a disproportion between the cellular and the fibre changes in the same neuronal systems, and the disintegration of the ventral nerve-roots in their intra-medullary and not their extra-medullary course, might have been mentioned, if only to show that the nature of the morbid process is far indeed from being settled. Several pages are devoted to trypanosomiasis and rabies, rarities seldom seen by the neurologist. Yet we miss any reference to the pathology of family spastic paraplegia, which is no more uncommon than these; aplasia axialis, Schilder's encephalitis periaxialis diffusa, and other conditions of interest in neurology are not touched on; the account furnished of diplegia and Little's disease and allied states is rather superficial, there being apparently no allusion to hæmorrhagic disease of the newborn, or to the état marbré of the corpus striatum, as morbid processes of pathogenic importance in connexion therewith.

Differences of opinion, not to mention actual controversies, are inevitable in neuropathology; reference to some of the points that might be modified or amplified is made chiefly because we welcome this useful and opportune contribution from the British school of neurology; we should like it to attain in future editions an even higher standard of usefulness, and comprehensiveness. The book will be appreciated by all students of neuro-pathology and those familiar with the subject will find it most profitable reading. It is well printed and the illustrations are clearly reproduced. The error in the heading of p. 69 should be corrected, and Dejerine in his life-time spelt his name without any accent, a detail to which we have ourselves, we admit, paid no consistent attention.

Le Réflexe Pilomoteur. By Dr. ANDRÉ THOMAS, Physician to the Saint-Joseph Hospital, Paris. Paris: Masson et Cie. 1921. With 74 illustrations and 12 plates in black and colour. Pp. 242. Fr.25.

THE appearance of a monograph of over 200 pages devoted to the pilomotor reflex alone is a sufficient indication of the attention now being given to the sympathetic nervous system. Exact description is taking the place of vague generalities, and the gradual evolution of suitable methods of examination is calculated to result in still greater discoveries than those of the last decade. Known for centuries to physician and layman alike, the pilomotor phenomenon has never been studied extensively, still less utilised for diagnostic or clinical purposes. Dr. Thomas supplies the clinician with precise details for its evocation in the normal individual, and furnishes many examples of its alterations under pathological conditions, notably in spinal and peripheral nerve lesions, as also in involvement of the sympathetic system itself. One of the useful features of the reflex is its visibility, so to speak, whereby the student of the subject can gain insight into the laws of sympathetic reflectivity. It is excitable either peripherally or centrally, the quality of the stimulus much more than its intensity being a requisite for the development of horripilation; on occasion it can make its appearance in circumstances which constitute it a "conditional reflex" in the Pavlovian sense. Depending largely for its apparition on the state of mind (affective, emotional) of the individual concerned, it is usually generalised when of central origin and unilateral when of peripheral, or it may be quite limited and localised, but transitions occur between the local and the general manifestations. Dr. Thomas appears to regard it in all circumstances as of cerebral origin, chiefly because of its extreme variability in degree and extent. Its analogies with and differences from vasomotor and sweat reflexes are fully considered.

Altogether, this is a notable contribution to the study of the functions of the sympathetic nervous system.

La Dégénérescence Hépato-Lenticulaire (Maladie de Wilson, Pseudosclérose). By H. C. HALL, formerly Chef de Clinique at the Hospital of Bispebjaerg, Copenhagen. With a Preface by Prof. PIERRE MARIE. Paris: Masson et Cie. 1921. Pp. 361. Fr.20.

THIS is an account of the disease known as progressive lenticular degeneration, which Dr. Hall christens hepato-lenticular degeneration; it is a model of what such contributions should be. It contains a survey of previously described cases, a detailed examination of some four personal cases, and a careful and informative discussion of the nature and pathogenesis of the affection. It is well printed and well illustrated, and, with a full bibliography, gives the neurologist a remarkably complete account of a condition which has awakened in recent years much interest and not a little controversy, both at home and abroad.

Dr. Hall's conclusion in regard to the question of the relation of the disease to pseudosclerosis is that the two conditions differ not in kind but in degree and that they are pathologically identical; he is doubtful as to the position of the disease at present called torsion-spasm, but thinks it probably belongs to the same group. Further, the author ranges himself with the minority who consider that progressive lenticular degeneration has its origin in "a congenital constitutional anomaly." We do not intend to enter into any criticism of these conclusions; it may be said, however, that Dr. Hall does not lay sufficient stress on the occurrence of acute cases of the affection, which run their whole course in a few months, or even weeks, and which do not correspond to the course of any congenital affection with which the neurologist is familiar. His contention that the disease is an "abiotrophy" in the sense employed by Gowers, and that the degeneration, both in brain and liver, is caused by a "congenital debility," is apparently based to a considerable extent

on his view that the essential pathology in both pseudosclerosis and progressive lenticular degeneration consists of a neuroglial proliferation which is "not a simple process of reaction after a primary degeneration of the parenchyma." In many cases of progressive lenticular degeneration, however, there is no neuroglial proliferation of this kind; the disintegrating parenchyma is never fully replaced by glial tissue; the process is one of primary parenchymatous degeneration and not of abnormal neurogliosis. Mention is made of the difficult problem of the varying character of the involuntary movements attributed to disease of the corpus striatum; less attention is paid to the fact that they often arise in cases where the lesions are not in that organ at all.

This is a sound contribution to a topic of considerable importance, and Dr. Hall's monograph will take a foremost place in the literature concerned therewith.

INSANITY.

Benign Stupors: A Study of a New Manic-Depressive Reaction Type. By AUGUST HOCH, M.D., late Director of the Psychiatric Institute of the New York State Hospitals. Cambridge: At the University Press. 1921. Pp. 284. 14*s.*

THIS work, which is an attempt to differentiate recoverable stupors from those belonging to the dementia præcox type, was interrupted by the death of Dr. Hoch and has been completed by Dr. John T. MacCurdy, whose name is familiar through his psychiatric work in this country during the war. By a study of its ideational content and symptoms Dr. Hoch was led to believe that benign stupor is a regression to a death-like state actually dependent upon a delusion of death, and he holds out the prospect of making a positive diagnosis before failure to recover leads to a conclusion of chronicity. An objective resemblance is seen in the two types which he explains by showing that the similar reactions are dependent upon *indifference* in the benign stupor, and upon *distraction* towards an inner and unreal world in those cases which tend towards dementia.

The clinical descriptions and the views of Dr. Hoch are important to those who seek a psychological explanation of the psychoses. The manic-depressive psychoses, among which he places benign stupor, are probably determined remotely by an inherent defect which is, however, non-specific; physical disease may also facilitate the production of a psychosis but be likewise non-specific, the actual psychosis being determined by psychological factors. This view, which is not claimed as original, reconciles ætiological theories which at first appear incompatible. A weak chapter is that on physical manifestations of stupor, in which Dr. Hoch has set out to find an explanation of the fever which sometimes marks the course of the benign variety; but he admits that the hypothesis he gives is only a tentative assumption.

COMPLEMENT-FIXATION TESTS.

Technique de la Réaction de Déviation du Complement de Bordet et Gengou. Deuxième édition. Par Drs. P.-F. ARMAND-DELILLE and L. NÈGRE. Paris: Masson et Cie. 1922. Pp. 196. Fr.9.

THE aim and scope of this monograph, of which a second edition is now before us, are clearly indicated by its title. The authors deal almost entirely with the laboratory technique of complement fixation and have little to say about the purely theoretical aspects of the question, or about the influence of modern physico-chemical views on this side of immunological technique. The book is written with a clearness of thought and expression which is wholly admirable; though the student may be a little disappointed when he comes to work at the laboratory bench and finds unsuspected practical difficulties. After a brief introduction, the authors proceed straight to their subject and describe the Bordet-Gengou phenomenon of complement fixation; there follows a chapter on the mechanism of action of hæmolytic serum, and the clinical laboratory test of complement fixation is described in full. Sections are devoted to the inoculation of animals for the production of antiserum, the bleeding of animals for obtaining complement, the titration of the various substances used in the Wassermann reaction, and finally a description of the reaction itself based upon the method of Calmette and Massol. A few of the well-known modifications of the Wassermann test are also described. Chapters I.–V. complete the first half of the monograph.

The second half proceeds to deal with the practical application of the method to complement fixation in tuberculosis—in which the techniques of Calmette and Massol, Besredka, Petroff, and Debains are described—followed by short accounts of the test in enteric and Malta fevers, dysentery, cholera, plague, and some of the mycoses; whilst the final chapter treats of this reaction in hydatid disease. The book contains numerous illustrations and titration tables, all of them clear. We are a little doubtful as to the value of perpetuating Ehrlich's diagrams of the working of complement; they do not help to a true physico-chemical conception. There is included a good bibliography of the early work on the subject, up to the year 1910. The meagre allowance of only two and half pages is given to references to work published since 1910.

We believe this monograph will be welcomed by the senior student and the post-graduate who wish to learn something more of this subject than can be found in the ordinary bacteriological text-books. It keeps to the high road, avoiding all tempting side-paths, and arrives at the destination for which it set out—a clear and concise presentation of the mechanism of complement fixation. It is not, and does not claim to be, in any sense a reference-book for research workers.

SURGICAL RESEARCH.

Papers from the Mayo Foundation for Medical Education and Research and the Medical School. I. 1915–1920. London and Philadelphia: W. B. Saunders Co. 1921. Pp. 659. 30*s.*

THIS volume is the first of a new series emanating from the Mayo Foundation. The papers in it are written mainly by the younger members of the staff. There are no writings from the pen of the familiar authorities of the clinic, the brothers Mayo, Balfour, Henderson, Carman, Braasch, Sistrunk, to mention only some. The papers, bacteriological, clinical, experimental, are of a very high average order of merit, and one gets the impression that some of the authors will undoubtedly rise to positions of eminence. There is a rather striking absence of that kind of publication which is a mere citation of a series of cases with the frequency of symptoms reduced to a percentage. Nearly always there is a definite directed effort to advance knowledge, and a better index of the spirit which pervades the institution could scarcely be given. Sixty-six such papers constitute no mean five-year output for a single medical school, associated though it be with an institution providing an abundance of clinical material.

A TEXT-BOOK OF SURGICAL ANATOMY.

Third edition. By WILLIAM FRANCIS CAMPBELL, A.B., M.D., F.A.C.S., Surgeon-in-Chief, Trinity Hospital; sometime Professor of Anatomy and Professor of Surgery, Long Island College Hospital. London and Philadelphia: W. B. Saunders Company, Ltd. 1921. Pp. 681. 15*s.*

THE fact that a third edition of this book is called for indicates that the author has written what the average American student wants. In this country most of the matter contained therein is taught in clinical demonstrations, and the British medical student seldom possesses or reads such a large volume on surgical anatomy. The book is well printed and illustrated, and the subject-matter is presented attractively, though inadequately in places. In such a large treatise on surgical anatomy one would expect

to find an account of the variations in the arrangement of the bile and cystic ducts, knowledge of extreme importance when a cholecystectomy has to be performed. In the description of the perineum there is no mention of the recto-urethralis muscle, and no good account is supplied of the approach to the prostate by the perineal route. Even a few small omissions of this kind detract from the value of the book to the practising surgeon, but the student will find all that is necessary for him to know for his examination.

SNAKES OF CEYLON.

By FRANK WALL, C.M.G., I.M.S. Colombo: H. R. Cottle. 1921. With 98 text-figures. Pp. 582.

THIS publication is issued from the Colombo Museum, and copies can be obtained on application to the Director. It consists of a complete systematic zoological description of the snakes of Ceylon with tables and keys for identifying the species and a full and most interesting account of their habits, reproduction, and life-history, and, in the poisonous varieties, their toxicology. We have seldom seen such a happy combination of museum work and systematics with first-rate field natural history, and anyone concerned with snake venom will find the book most useful. It is curious, for instance, to note the varying tempers of the venomous snakes. Echis is thoroughly truculent and vicious; the cobra is timid, and the krait inoffensive; the sea-snakes are extraordinarily peaceful and are freely handled by fishermen with impunity; while if any of these get in a good bite it is almost certainly fatal. The book is dedicated to the author's father, George Wall, who for nearly 50 years spent himself in public service in Ceylon: a brief notice of his activities forms an introduction to a volume in which his son, along different lines, carries on the family tradition. The printing and arrangement are excellent except for the page headings, which monotonously repeat "Snakes of Ceylon," instead of giving the name of the snake dealt with on each page: this is a rather serious obstacle to ready reference and necessitates constant resort to the indices.

NOUVEAU TRAITÉ DE MÉDECINE.

Fasc. VII.: Avitaminoses: Maladies par Agents Physiques. Troubles de la Nutrition. Publié sous la direction de G. H. ROGER, FERNAND WIDAL, P. J. TEISSIER. Pp. 552. With 32 figures in the text. Paris: Masson et Cie. Fr.35.

THE seventh volume of this encyclopædia of medicine deals with deficiency diseases, snake poisoning, anaphylactic troubles, serum sickness, and injuries due to physical agents such as heat, cold, compressed air, electricity, and X rays. The latter half of the volume is devoted to disorders of nutrition including gout and diabetes, and is written entirely by Dr. Paul Legendre. The general standard is high.

In this volume the subjects discussed are in many instances comparatively new, and upon these dogmatic statements must not be made. Prof. Roger in his introductory chapter on Vitamines and Avitaminoses sets an excellent example of the way to marshal the information available in a new field. Without taking sides in debatable points he fairly presents the facts recorded by various observers. His verdict on the term "vitamin" illustrates a happy combination of a judicial mind with common sense. "The expression vitamine is thoroughly bad . . . . still it has become classical." In this spirit he accepts the term "Avitaminoses" as sufficiently descriptive of a certain series of disorders to serve as a label of identity. Scurvy, pellagra, and beri-beri come within the scope of this volume. It seems a pity that rickets is not included also, instead of being reserved for Vol. XXI., where it finds itself in strange company with diseases of muscles, chronic rheumatisms, and arthropathies. Prof. Perroncito in his chapter on Pellagra does not refer to the "Report of the Egyptian Inquiry into Pellagra" or to Wilson's views on the biological value of protein; these omissions render the whole chapter useless, save as an historical summary up to a point.

Calmette on snake-venoms makes delightful reading. Here, as in his volume on "Tuberculosis," this great man brings the laboratory so close to the bedside as to leave no doubt that the clinical physician of the future will take Calmette for his exemplar as a passing age has taken Sydenham. The chapters on diabetes and gout cover well-trodden ground: they demonstrate how much toilsome work has been done; they also show how scanty are the real additions to our understanding of these ancient disorders of metabolism. The work is well recorded and every manner of treatment appears to be described and considered except—and it is an important and damaging omission—in the dietetic treatment of diabetes Allen's starvation method is not even mentioned. After reading the chapter on gout one is inclined to wonder whether in our grasp of the pathogeny of this disease we have advanced very far beyond the wisdom of the Hippocratic aphorism "Eunuchs do not take the gout nor become bald."

The "Nouveau Traité de Médecine" is, on the whole, a sound epitome of the medical knowledge of our time, and editors and publishers alike are to be congratulated on the success of a vast undertaking.

MAN—THE ANIMAL.

By W. M. SMALLWOOD, Ph.D., Professor of Comparative Anatomy in Syracuse University. New York: The Macmillan Co. 1922. Pp. 223. 12*s.*

THE author sets out to deal with the relationships of biological discovery to the physical existence of man for the information of lay people. The several chapters discuss metabolism, reproduction, heredity, sensation, learning, disease, and kindred subjects. Persons with no previous biological training would learn much that was new to them, but they would find the book dull reading and in places very hard reading, because the author has failed to realise the profundity of the gulf which separates his knowledge and experience in this particular field from that of the ordinary educated man. Cytology, for instance, and the play of the chromosomes in maturation and fertilisation are not subjects which can be apprehended as incidents in a short book. Instructed students will read it with more profit, but they will want some critical sense. It is strange, for example, to find among the "laws of living protoplasm" no mention of the axiom that living matter occurs only in certain pieces or quanta which are known as organisms and which are indivisible. On the contrary more than a chapter is given to the cell as the "biological unit," and the author seems to have got no further than the proposition that all living things "can be analysed in terms of the cells found in each." Perhaps it is this passion for analysis instead of synthesis which leads to the amazing swagger of such untruths as (p. 204) "man has come to have almost complete control of the inorganic universe through the application of the scientific method," and (p. 211) "we know nearly all that we shall ever know about the physical range of variation in man." Those who think to make their world a better place will be dismayed by the certainty with which Prof. Smallwood decides (p. 81) that nature is everything and nurture immaterial. There is a complete muddle about immunity (p. 140) and the tubercle bacillus happens to be one which does not follow the usual bacterial habit of dividing every half hour (p. 20). It is questionable whether the statement (p. 15) that the 13 elements essential to life, which include chlorine and silicon and omit aluminium "are the most numerous in the rocks, water, and atmosphere" is correct; Clarke's data hardly correspond. But we may well be grateful for the reminder (p. 203) that Liebig wrote: "the majority of our controversies arise from the fact that we are too much in the habit of attributing to one cause that which is produced by several." John Morley somewhere calls the attribution of complex results to simple causes one of the fundamental human vices. The author would do well to ponder this. For he evidently belongs to the school of thought which looks for fundamental truths in the means and mechanisms of biology rather than in the ends and results.

PUBLIC HEALTH SURVEYS.

What they are—How to make them—How to use them. By MURRAY P. HORWOOD, Ph.D., of the Massachusetts Institute of Technology. London: Chapman and Hall, Ltd. 1921. Pp. 403. 21*s*.

THIS is an elegant book, printed on thin paper, in a limp leather cover, with numerous photographic illustrations and diagrams. It gives a complete survey of the science and art of sanitary survey-making, and no worker with this manual at his elbow is likely to overlook any aspect or detail of sanitary work in making a survey. In a foreword by the late Prof. W. T. Sedgwick the public health survey is briefly characterised as "the principal breakwater against the flood of sometimes misdirected popular enthusiasm and the sure guide to wise municipal action." Prof. G. C. Whipple's longer introduction is most suggestive. He draws an admirable distinction between public health and the collective result of private health—a difference between mass action and collective action. He also draws attention to that common error in these documents which has been described as emptying the note-book into the printed report.

The book is systematically arranged. There are several chapters describing the organisation of surveys and methods of carrying them out, and others dealing with each of the chief subjects of inquiry, as water-supply, drainage, milk-supply, food centres, housing, schools, health organisation, and control of special diseases. The analysis of city budgets forms the subject of a useful chapter; it is stated that a subvention of from a half to one dollar per capita per annum is required for efficient health work. Good advice is given on the writing of a convincing report; a useful lesson taught is that every report should enable the reader to appreciate the relative as well as the actual value of each section. In this country the place of the survey in fully organised districts is taken by the regular work of the health department and the annual report of the medical officer of health, which is, in fact, an annual stocktaking. But few of these would enable the members of a local authority to deduce the relative values of different activities, and the possibilities of further progress if reasonable financial allotments are made.

The perusal of this book might well clarify the ideas of some medical officers of health in this country, and show them how they can stimulate interest in their plans by a rearrangement and simplification of their reports.

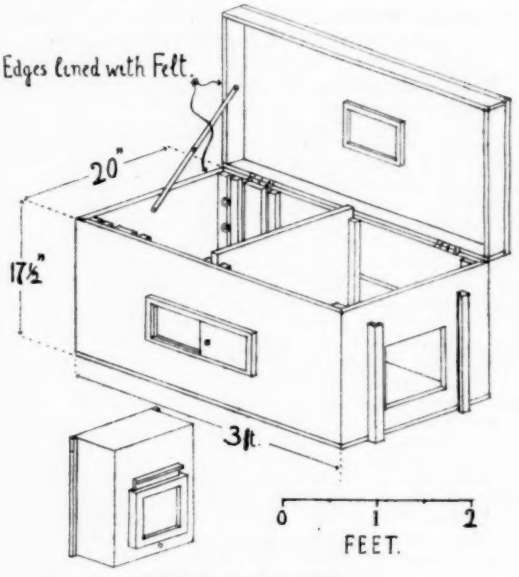
New Inventions.

AN IMPROVED METHOD OF INDUCING ANÆSTHESIA IN ANIMALS.

THIS method was devised for the rapid induction of anæsthesia in animals without the disadvantages of the older methods. One of us (B. A. McS.) was responsible for the anæsthetic box, the other (S. R. W.) for the method of administering the anæsthetic.

The box is made of wood (see figure) lined inside with tin. It is 3 ft. long, 1 ft. 8 in. wide, and 1 ft. 9 in. high. Three windows with shutters are fixed in the box, one on either side and one in the lid, so that the different stages of anæsthesia may be observed. At one end of the box is a piece of wire gauze over which is fitted a small box attachment. A slide in the box attachment lifts up, so that the animal may breathe air if required. The interior of the box is divided into various sized compartments by moving the partition, so that one large animal or several smaller animals can be anæsthetised at the same time. One end of the box is fitted with rings so that animals may be tied down.

Ether is given in the form of hot ether vapour by the ether bomb described and illustrated in THE LANCET a year ago.[1] The ether vapour is delivered in the box by a small tube which carries the vapour from the bomb, and is held in the wire gauze by a nozzle attachment. The ether bomb is placed in a basin of hot water, and the amount of hot ether vapour delivered into the box regulated by a valve. The inductions are carried out automatically. For chloroform anæsthesia or for mixture of chloroform and ether, a Shipway apparatus for warm anæsthetic vapours is used, an oxygen cylinder being attached in place of the hand pump. The animal may be kept for long



Drawing of anæsthetic box.

periods under the anæsthesia by raising the slide of the box attachment, the animals being allowed to breathe air.

It was found advantageous to inject morphine and atropine before placing the animal in the box. 1/6th g. morphine hydrochloride + 1/180th g. atropine sulphate is dissolved in 10 minims of water, and 5 minims are injected subcutaneously into the thigh of the animal about ten minutes before induction. This preliminary injection prevents salivary secretion and keeps the air-passages free. It was found that complete anæsthesia is obtained with the dog or cat in six or eight minutes: the animal is then removed from the box, and administration of the anæsthetic is continued by a small open ether Schimmelbusch mask or through an intratracheal tube.

Observations.

1. This method provides a simple automatic means of administering ether to animals—particularly cats and dogs. 2. Induction is smooth and rapid. No handling of the animal is necessary and anæsthesia is produced without struggling or noise. 3. The method is safe and simple, and up to now no animal has been lost. 4. During induction the various stages of anæsthesia may be demonstrated to students without disturbing the animal. 5. The depth of anæsthesia can be most accurately controlled in accordance with experimental requirements. 6. The method is equally valuable for chloroform anæsthesia. 7. Two large and several small animals can be anæsthetised simultaneously, so that considerable time is saved in the preparation of decerebate and decapitate specimens by Sherrington's methods.

We are indebted to Mr. S. L. Mucklow for the drawing of the anæsthetic box.

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[1] THE LANCET, 1921, i., 336.

THE LANCET.

LONDON: SATURDAY, APRIL 29, 1922.

The Examinations at the English Conjoint Board.

THE new, but provisional, regulations of the Examining Board in England of the Royal College of Physicians of London and the Royal College of Surgeons of England have been issued this week, and we believe the Board to be so far the only examining body which has laid down details for a reformed curriculum. These regulations, which come into force on Jan. 1st next year, are provisional in the sense that the Colleges reserve to themselves the right to make certain modifications in the event either that any of the English universities should adopt conditions making modifications desirable, or that at the meeting of the General Medical Council in May next some alteration of general circumstances may emerge. The regulations apply to medical students who pass the preliminary examination in general education after Jan. 1st, 1923.

In the new regulations the Colleges have set themselves to solve the series of problems, arising out of an overloaded medical curriculum, which have been debated at the General Medical Council for at least 15 years, sometimes with great acumen and at others with considerable waste of breath. In this way it has been made clear that, owing to the increased demands upon medical students in the earlier part of the curriculum, many of them did not pass their examinations in the preliminary subjects until after they had made a beginning of the professional section of their studies. This fact embarrassed the students during their pursuit of anatomy and physiology, and led in its turn to a muddle and rush in the fifth year of the course, book-work and cramming interfering with or superseding the pursuit of clinical practice. The medical curriculum in its present shape was devised to leave two years of the medical student's work absolutely free for clinical instruction, but all engaged in the practical work of teaching know that two years, even if they are not encroached upon by the undischarged liabilities of the previous three years, are not sufficient to allow of a real clinical grasp being obtained of the science of medicine, now so multifarious and so detailed in its subdivisions. As a result, the feeling among those responsible for medical education in many of the schools has been that the passing of preliminary scientific examinations should be made compulsory before the admission of students to the study of anatomy and physiology began, and this feeling found expression at the General Medical Council. The various points of difficulty which would arise under such a reform have been debated at the Council, and many excellent suggestions along different lines will be found in the reports of the Education Committee, and in the notes upon these discussions and reports which have appeared in our own columns. Further, the addendum to the Council's minutes for 1921, which has been published as a substantial volume (see p. 861), contains the report of the Examination Committee of the General Medical Council on the last series of inspections, in which the reasons for innovations will be recognised. The English Conjoint Board, whose examinations have long been a model of pass-examinations of a high standard, is the first body to publish a definite scheme under which, by relegating the commencement of scientific work to school education, the five years at the disposal of the student can be spent in ordered professional training, the purely scientific equipment playing its part at each stage in the acquirement of medical knowledge.

The new regulations for the curriculum at the English Conjoint Board are therefore the first to give expression to the need for reform which all admit. Under the existing regulations of the Board, and in conformity with the views of the General Medical Council, as laid down when the medical curriculum was lengthened from four to five years, the student is required to give five years to professional study, counting from the date of passing a matriculation or preliminary examination in ordinary school subjects. For these five years the curriculum was arranged so that he should spend three years in the study of chemistry, physics, biology, anatomy, and physiology, leaving two years in which to acquire clinical efficiency by the attendance of hospital practice. The new regulation of the English Conjoint Board puts back the study of the preliminary sciences to a pre-medical period, leaving five years to be spent in anatomy and physiology and clinical work after the preliminary science subjects have been completed. Thus a student may pass in chemistry and physics whilst he is still at school and must do so before he commences his medical curriculum. He may do this through the medium of certain school certificate examinations or he may take the subjects in a special examination which will be conducted by the Royal Colleges as a pre-medical examination. But, and this is a very important point, chemistry will again be studied at the medical school together with biology in connexion with physiology, while embryology and histology will be included with anatomy. These subjects will cover a period of five terms, so that a student who enters in October will be able to take what will now become the first professional examination in anatomy, physiology, pharmacology, and materia medica in April of his second year, and he will still have the opportunity of completing the examination, should he fail, in July of his second year. Also his school acquisition of chemistry and physics will live again in his professional acquisition of anatomy and physiology, and a continuity of work will be obtained. Lastly, the student should have a clear three years in which to do the clinical part of the curriculum thoroughly before admission to the final examination, and again the same excellent principle of continuity is observed, for during this period of three years he will be required to attend courses of applied anatomy and physiology as well as all the special courses incidental to modern medical training. The new regulations contain also many sagacious innovations in respect, for example, of gynæcological study, of arrangement of examinations, and of exemption from formal lectures; but the two main objects which they have been designed to secure have been brought out. They are continuity of scientific work and opportunity for clinical study.

Miners' Nystagmus.[1]

DURING the last three years the needful grants have been made by the Medical Research Council towards the expenses incurred by a Committee, appointed in 1920 at the request of the Home Office, to investigate the problems of miners' nystagmus. The Committee, over which Prof. J. S HALDANE presided. consisted of Prof. E. L. COLLIS, Professor of Preventive Medicine in the University of Wales; Mr. G. H. POOLEY, whose special contribution was the clearing up of the relationship of miners' nystagmus with refraction errors; Dr T. L. LLEWELLYN, who acted as secretary, and Dr. W. H. RIVERS, appointed with respect to the frequent accompaniment of nystagmus with nervous or mental conditions. This Committee has now made its first report, which is unanimous, while its conclusions point definitely to certain directions in which prevention of nystagmus can be carried out, and reveal the importance of nystagmus among occupational diseases. These diseases only contribute a small percentage to the bulk of illness experienced by industrial workers, but the relation between cause and effect, as illustrated by workaday risk and its results, is of paramount interest. And among occupational diseases, miners' nystagmus to-day stands first in prevalence; though when, in 1907, it was included in the schedule of diseases for which compensation must be paid, few could have anticipated that it would be found to account for over 90 per cent. of the compensation cost of all industrial diseases. An authoritative and accurate report, based upon careful inquiry by an expert committee, was, therefore, a national need. The body of this Report has been written by Dr. LLEWELLYN, who has devoted many years to intensive study of nystagmus among miners at work underground, especially those so affected as to claim compensation under the Act.

History tells that the condition of nystagmus was unknown until naked candles, on account of the danger associated with their use in mines where explosive gases are present, were replaced by safety-lamps. Even with the most modern improvements these lamps give far less less illumination than candles. The photometric evidence collected of the amount of light prevailing in the workings of coal-mines is an excellent example of the careful research upon which this Report is based; it reveals the profound conditions of dimness and obscurity in which coal-mining is pursued. Some measure of this gloom may be estimated when we recall a recommendation of the Departmental Committee on Lighting, which was that at least four-foot candles are needed for a seamstress to work with black velvet without discomfort; at the coal face with naked candles the illumination averages 0·09 foot-candles and with safety-lamps only 0·018 foot-candles. Little wonder then that human vision frequently breaks down in the mines under such darkness. Every other possible influence has been carefully considered in the Report. Posture at work was long claimed by many to be the predominant ætiological factor; errors of refraction have been suggested by some to be a deciding influence; evidence shows that accidents may precipitate an attack; gaseous impurities in mine air, depth of the workings, and hereditary predisposition have all been put forward as playing their pathological part; but in the Report, and on good grounds, all these are set aside as of only secondary importance until the psychoneurotic complications begin to appear. The skilled miners who have to use their eyes most are most affected; and in 1920 over 7000 men were in receipt of compensation on this account. The prevalence of the disease varies greatly on the different coalfields; in the candle-lighted pits of the Forest of Dean it is almost unknown, the percentage incidence being only 0·04, while in the pits of North Staffordshire it amounts to 1·5. The economic drain to the mining industry, having regard to loss in wages, in output, and in compensation, is estimated at about £1,000,000 a year. The study of the disease, carried out by Dr. LLEWELLYN in the pits, is based upon an examination of 2000 cases, a group sufficiently large to justify deductions as to the prevalence of different objective and subjective symptoms and their factors. The disease is found to be slow in developing. The average age at time of failure is 42 years and the average duration of work underground 26 years. The condition may remain latent for years; and special interest attaches to the widespread existence, amounting to 25 per cent. of all men working in safety-lamp pits, of objective signs of the disease with but few, if any, subjective symptoms. The onset of manifest symptoms may be precipitated by accident or illness, but is usually gradual; it precedes complete incapacity for an average period of 14·5 months. Should the disease, owing to one or two men breaking down and establishing compensation claims, become a matter of unusual interest in any pit, a large number of claims often result, showing the psychoneurological bias.

Deriving his information largely from a special Report to the Committee by Dr. H. W. EDDISON, who was appointed to inquire into the psychoneurotic aspect of the disease and who worked for six months with the miners of Staffordshire, South Wales, and Yorkshire, Dr. RIVERS points out that two groups may be distinguished: (1) those cases beginning with nystagmus in which an anxiety state subsequently supervenes, and (2) those in which the psychoneurosis is primary, or at least of a severity and duration greater than can be set down to the ocular condition itself; in some cases of this group nystagmus may not develop at all. Exact figures for the combination of nystagmus with the psychoneurotic symptoms of tremors, sweating, tachycardia, apprehension, depression, and disturbing dreams are not given as far as we have noticed, but the general statement is made that it occurs to a "large extent." The point is of considerable theoretical and practical importance, for the scope of the problem is materially widened if miners' nystagmus is to be regarded as leading largely to the development of psychoneurotic disorders, or occurring with them, or, more particularly, if it is not to be rigidly separated from those cases of neurotic disturbance in which the ocular phenomena are absent. That such is the case is plain from a perusal of Dr. RIVERS's contribution. The question is thus seen to be essentially similar to that of the neuroses of war, and brings us face to face with the difficult factor of "the unconscious motive." In any thoroughgoing investigation of the problem it is imperative to bear in mind that practically all underground workers are subjected to the same conditions of defective illumination, as all in the fighting line were subjected to the same strain and stress, yet only a proportion develop the neurosis of nystagmus, for such it must be considered. Additional ætiological factors are clearly involved, and in their search for these the Committee note how the condition frequently becomes manifest only after an injury, and are impressed by the occasional occurrence of a "hereditary disposition," while the vexed question of the influence of errors of refraction is discussed without any conclusion being arrived at. But no one who reads the Report can fail to be impressed by the fact that

[1] Medical Research Council. First Report of the Miners' Nystagmus Committee. London; H.M. Stationery Office. 1922. Pp. 64. 1s. 6d.

since the introduction of compensation the prevalence of disabilities from miners' nystagmus has vastly increased; there is no question whatever, as Dr. RIVERS insists—and in this his contention will be borne out by all who have to do with the problem of the neurasthenic war pensioner—that monetary compensation has led to the actual production, and still more largely to the prolongation, of disability to work.

Apart, therefore, from that minority of cases, as we must suppose them, in which the nystagmus is monosymptomatic—a curable fatigue-neurosis, presumably—there remain for consideration a larger group whose symptoms, ocular and general, are precisely those of the psychoneurotic of war, and for that matter of civilian life too, and in which, as already suggested, the "unconscious motive" must be the basic factor. We wish, on this account, that the sufferers from the condition, or some of them, could have been submitted to more detailed psychological examination, for only in this way can the questions of prevention and treatment be satisfactorily envisaged. Dr. RIVERS makes it evident that by merely attacking the factors which produce nystagmus we shall not thereby necessarily get rid of miners' psychoneurosis. If the view we have adumbrated is correct, it is the man as much as the defective illumination that has to be put right. Immense, indeed, is the problem for industrial psychology that is thus brought before us. It will be remembered that in the later years of the war America had the time and the opportunity to introduce a preliminary psychological investigation of her recruits with a view to the sorting out of the "misfits," the potential neurotics, and if a great deal was not thus accomplished the effort nevertheless was as scientifically praiseworthy as it was important practically. It is the industrial "misfits," potential psychoneurotics, who subsequently cost the mining industry much of the money (according to the Report, about £300,000 for the year 1920) by way of compensation, and their numbers are on the increase. For this very serious state of affairs, as Dr. RIVERS justly calls it, we see no remedy except by the prosecution of still further study of the psychoneurotic aspect of miners' nystagmus, and while improvement in illumination is surely calculated to be of prophylactic value we await the day when industrial psychology will come into its own and aid employers and employees alike by indicating the lines on which the task can be made to suit the worker, and the worker the task.

For the purposes of the Report, the coalfields of South Wales and North Staffordshire were subjected to intensive inquiry, and maps are given showing how the incidence of the disease varies directly with the kind of coal got and the proportion of safety-lamps used. The Report contains also useful diagrams and excellent illustrations in explanation or support of the unanimous conclusion of the Committee, which are: (*a*) that the essential factor in the production of miners' nystagmus is deficient illumination; (*b*) that the deficient illumination is due to the low illuminating power of the safety-lamps generally used by coal-miners; (*c*) that workers at the coal face are more affected than other underground workers; and (*d*) that distinct signs of nystagmus are present in a large proportion of coal-miners, though only in a small proportion do the symptoms ever become so severe as to cause even temporary incapacity for work underground.

THE British Spa Federation is meeting the railway managers at the Railway Clearing House this week (see THE LANCET, April 15th, p. 773) to discuss the issue of cheap return tickets, lasting 28 days, for spa visitors.

Annotations.

"Ne quid nimis."

EYESIGHT OF SCHOOL CHILDREN.

AN interesting inquiry into the prevalence of defective eyesight among children attending the public elementary schools in the North Riding of Yorkshire is published by Dr. H. P. Newsholme in his annual report. It summarises the results of testing 22,000 children. Of the boys 8 per cent., and of the girls 8·5 per cent. were found to have grossly defective vision—i.e., 6/12 or less in both eyes, or 6/18 or less in one eye, while an additional 11·3 per cent. of the boys and 13·3 per cent. of the girls had slighter visual defects—i.e., 6/9 in both eyes, or 6/12 in one eye. In the infant departments the percentages were higher, but this was probably due to untrustworthiness of records of children unable to read. The chief points brought out in the report are (1) an increase in the proportions of serious visual defects as the children advance in the school. This has been shown by previous investigators to be due to the increase of the long axis of the eyeball during school life in those predisposed to myopia, some emmetropic eyes becoming myopic and those with low hypermetropic astigmatism sometimes acquiring the mixed and later the myopic forms. (2) This prevalence of defective eyesight, both serious and slight, is noticeably greater among girls than among boys. This is frequently attributed to the strain thrown on the eyes by sewing. In this connexion it is noted that the Education Committee's scheme of needlework ceases to refer to the need for large needles and coarse stitches at standard III., and that the difference between the sexes is only found at and above this standard. (3) The gross degrees of visual defect appear to increase in prevalence with increasing urbanisation, country towns being worse than rural areas in this respect, and large urban areas worse than country towns. The suggested explanation is that the conditions of town life are more unhealthy than those of country life. This would be an efficient cause of the increased prevalence of myopia, and it is probable that an excess of myopia is the main cause of the difference, though on this point the report throws no direct light.

ARSENIC AND BISMUTH IN SYPHILIS.

THE treatment of syphilis by bismuth recently introduced by Sazerac and Levaditi sometimes produces buccal complications which are both sudden and serious; deep ulceration of the mucous membrane has been known to follow two small doses of bismuth injection. This, like all other toxic stomatitis, is caused by a fuso-spirillary symbiosis and is curable by the arseno-benzenes introduced either intravenously, subcutaneously, or by simple local application. MM. Sézary and Pomaret[1] have conducted some researches which tend to show that the addition of an arseno-benzene to bismuth offers considerable advantages in the treatment of syphilis and have brought to light some interesting facts. Arseno-bismuthic combinations are so unstable that they cannot be perserved for any length of time even in hermetically sealed tubes kept in the dark. The difficulty, however, may be overcome by combining the two substances at the moment of injection in the same syringe. These authors made use of amino-arseno-phenol and soluble tartro-bismuthate of potash and soda; they aspirated into the syringe 12 cg. of the former and then 1 c.cm. of a solution containing 10 cg. of the tartro-bismuthate. The bismuth combines quickly with the arsenic and the product must be injected into the muscles without delay; what is injected is really a true compound and a mixture about to form a compound. These injections were repeated three times a week, and a stronger mixture containing

[1] Le Progrès Médical, Feb. 25th, 1922.

25 cg. of amino-arseno-phenol with 10 cg. of tartro-bismuthate was administered every five days and even twice a week. Patients received as many as 25 injections without any special measures of precaution, and in not one of them was any stomatitis observed even in subjects who for the most part neglected their dentition. MM. Sézary and Pomaret continued their researches with this product by intravenous injections in animals. It is well known that salts of bismuth introduced into the general circulation are toxic. An intravenous injection of 15 to 20 cg. per kilo of tartro-bismuthate of potash and soda is sufficient to cause death in a rabbit soon after, if not during, the injection. It was found, however, that the toxicity of the arseno-bismuth compound was less than that of the bismuth which enters into its composition; the bismuth appears to lose its general toxicity and its harmful action on the buccal mucous membrane. It appears that this new product may be utilised with advantage in the treatment of syphilis; it combines the active treponemicide action of both components and acts with extreme rapidity on secondary cutaneous lesions even when infiltrating and especially in arsenic-resisting cases.

TISSUE CULTURE.

THE success of Dr. A. H. Ebeling in maintaining in culture for a period of eight years a piece of connective tissue isolated from the heart of a chick embryo was the subject of comment in THE LANCET.[1] There are now published on the same subject the researches of Prof. Otto Busse, whose recent death has been a blow to the faculty of pathology at Zurich. Prof. Busse has demonstrated[2] the power of growth of animal tissue on a sterile medium of blood plasma, using pieces of rabbit's heart or aorta. After an incubation period of one, two, or three days fine threads and spicules are seen growing out from the edges of the tissue. These threads and spicules soon develop into a dense network of spindle and stellate cells, which rapidly increase in number, until a fine halo can macroscopically be seen surrounding the tissue. Such cultures can be kept for months and even years provided the medium is periodically changed. If the culture becomes infected with bacteria in the early stages of its growth, the surrounding layer is found to contain only round cells; but at a later stage, when round cells are found mixed with spindle and stellate, or still later, when the network is well developed, the whole layer undergoes dissolution and is replaced by round cells only. Similar changes can be observed after chemical alteration in the plasma culture medium, as, for example, after injection of turpentine water into the animal some hours before the serum for the medium is withdrawn. That the round cells are a specific reaction against a foreign irritating substance can be well demonstrated by allowing bacteria access to one side only of the piece of tissue. On this side the round cells are developed, while on the other side the usual spindle and stellate cells remain. Further, if a colony of bacteria is grown at a little distance from the tissue, the round cells are seen to stretch out in broad streams towards the colony and finally to collect in and around it, demonstrating the presence of chemiotaxis. Whence come these cells, and what is their nature? This is what Prof. Busse sets out to answer.

One theory is that they were cells which had accidentally wandered into the tissue from the blood and were nothing more than migrating leucocytes. This theory may possibly be held when the round cells are visible in fresh cultures, but it is more difficult to support when they are first seen in cultures that are already 5–10 days old and in which the spindle and stellate cells are well developed; and it is completely untenable when the round cells are found in a pure spindle and stellate cell culture, as in the following experiment. The central piece of tissue can be removed with forceps from its halo of newly formed spindle and stellate cells, and these cells will go on reproducing themselves for weeks and months so long as the culture is maintained in its sterile condition. But as soon as contamination is allowed, round cells appear in the network, and their daily increase can be accurately noted. The number of round cells increases at the expense of the highly developed spindle and stellate cells, which draw in their processes and degenerate into round cells, while at the same time the fibrinous meshwork of the culture medium undergoes solution and the whole culture becomes fluid, simulating the process that takes place in the body when pus is formed. From these observations there can be no doubt that the round cells come from the descendants of the tissue cells themselves and not from any hypothetical leucocytes. What is, then, the nature of these cells? They resemble in many respects leucocytes, for one finds among them cells with U- and S-shaped nuclei. Some of them show granulation in their protoplasm, which is more often eosinophile than basophile, and round cells have been found that in every morphological character resemble neutrophile leucocytes. For some time the objection was raised that in spite of their morphological resemblance these cells were not true leucocytes, for they failed to give the oxydase reaction, but recently Prof. Busse has come to the conclusion that it is not surprising that the chemical conditions in a small drop of plasma are not the same as those present in the circulating blood in men and animals, for many of the chemical auxiliaries of the body must necessarily be missing. Possibly through improvement in the culture medium it may be possible to produce those conditions in which an oxydase reaction will be positive.

Prof. Busse points out, further, that it is by no means true that tissue will only grow on plasma from the same animal. Embryonic tissue especially is easy to cultivate in a foreign plasma—e.g., tissue from a young chicken was grown on dog's plasma, and true mitosis was observed. Cultures of human connective tissue and of various tumours have been grown with success on animal plasma, but great difficulty has been experienced in using human plasma, because, even in the absence of infection, human plasma tends to liquefy and the firm medium which is necessary for accurate observation of tissue cultures is not obtained.

[1] THE LANCET, 1920, i., 335.
[2] Sitzung der Gesellschaft der Aerzte in Zurich, Jan. 12th, 1922.

SOCIAL SERVICE AND THE SANATORIUM.

THE idea of combining social work with sanatorium care owed its origin in France to the American Red Cross in 1917. It has gained official recognition in that country, and is now to be introduced into Belgium by Dr. Toussaint, who recently, on the eve of assuming the direction of Tournai Sanatorium, exposed his conception of a social department to the Belgian National Tuberculosis Society. He first laid down the principle that a doctor's responsibility to his patient cannot be terminated automatically at the end of six months' treatment, but must continue through the duration of the disease. Such a responsibility is too serious to be discharged by a little verbal advice, and a pamphlet when the patient is leaving the sanatorium. As a sanatorium physician Dr. Toussaint insists that only curable cases shall be admitted, and that it is part of the superintendent's responsibility to be able to choose only those cases which have a reasonably good chance of ultimate cure. A workshop is to be attached to the sanatorium, in which various trades will be taught to the patients (dress-making, sewing and embroidery, cardboard work, book-binding, typing, basket-making, artificial flowers, toys, &c.)—the patients learning these trades under the closest medical supervision. When a certain maximum working day has been fixed for a given patient, it becomes the duty of the social department to place this patient in the conditions for which his health fits him, and either to secure for him wages which are sufficient for his maintenance or

else to find supplementary allowances making up his wages to this amount. For the social department of a sanatorium of 100 beds a single whole-time public health nurse is considered sufficient. Voluntary workers may help, but cannot replace her. No patient may be discharged until his future has been assured in advance.

VENEREAL DISEASE IN LONDON AND ENVIRONS.

THE London County Council proposes to continue the arrangement, which has worked well in the past, of joining with the County Councils of Buckingham, Essex, Hertford, Kent, Middlesex, and Surrey, and the Croydon, East Ham and West Ham County Borough Councils, for the common utilisation of the facilities afforded by certain London hospitals for diagnosis and treatment of venereal diseases. During the year 1921 the number of patients' attendances at the various clinics was 496,209, as compared with 464,033 for 1920. The number of new cases was 25,418, representing a reduction of 5628. Only four clinics showed an increase of numbers. The reduction is attributed mainly to the disappearance of abnormal conditions associated with the war and demobilisation. "No doubt it would be reasonable to assume," state the L.C.C. Public Health Committee, that it is also due, to some extent, to the effects of the continuous anti-venereal campaign."

INTERNATIONAL CONGRESS OF OTOLOGY.

THE Tenth International Congress of Otology will take place in the Ecole de Médecine, Paris, on July 19th, 20th, and 21st, immediately following the two days' annual meeting of the Société Française d'Oto-Rhino-Laryngologie. The date originally fixed for the Congress was altered to prevent its clashing with the meeting of the British Medical Association at Glasgow; the French organisers of the Congress are anxious to welcome a large number of English-speaking visitors. The president of the British Organising Committee is Dr. Urban Pritchard, the chairman, Sir StClair Thomson, and the hon. secretaries are Dr. Lionel Colledge, 22, Queen Anne-street, London, W. 1, and Dr. J. S. Fraser, 50, Melville-street, Edinburgh, either of whom is prepared to give all information concerning present arrangements. The subscription to the Congress is Fr.100 (£2), which should be forwarded to the treasurer, Dr. G. Laurens, 4, Avenue Hoche, Paris, 8°. Those who intend to read papers or join in debates should write direct to Dr. Hautant, 28, Rue Marbœuf, Paris, 8°. It has been decided to hold an exhibition of anatomical and pathological specimens (macroscopic and microscopic) connected with diseases of the ear, nose, larynx, and pharynx. Those who desire to exhibit specimens should communicate the number and description of the latter to Dr. P. Truffert, 2, Rue Ambroise Paré, Paris, 10°.

A CANINE REJUVENATION EXPERIMENT.

Dr. Knud Sand communicates[1] an interesting example of Steinach's methods, which as an isolated case he does not wish to overstress, but which seems well attested and of a striking character. In May, 1921, an acquaintance brought to him at a pathological institute in Copenhagen, a pedigree German pointer, 12¼ years old, whose life the owner despaired of owing to senile changes; he contemplated having the dog killed. Sand took the precaution of sending the animal to Prof. Hansen, of the Royal Veterinary and Agricultural College of the same city, for a preliminary report. This affirmed that the dog suffered from pronounced senility, with the symptoms of dull eyes, thin coat, deafness, and thickened inelastic skin. It could move only with difficulty, was emaciated, and often had incontinence of urine and fæces. There were no signs of organic disease except cirrhotic kidney, which was almost universal in old dogs. A tuberculin test proved negative. In spite of misgiving as to whether an anæsthetic would be borne, Sand performed on May 23rd resection of the left epididymis and right-sided vasectomy. The effects of the operation had been completely recovered from by June 15th. In a week's time from this both testicles were felt to be distended, the right more so. However, very little retrogression of senility occurred, and at the end of the month the animal was returned to its owner, who, on Oct. 25th, wrote that three or four weeks after discharge the dog became brisker, its appetite better, and its coat thicker. By the end of August it could run behind a bicycle slowly ridden and the sexual appetite revived: sight and hearing improved and it no longer slept all day. In September great strides were made, so that he again used it for sporting purposes and regarded it as equal in every way to a dog seven years old. The animal was again examined by the veterinarian already mentioned, who expressed great surprise at the change in it. The author concludes by recommending such treatment to the attention of the veterinary profession.

[1] Zeitschrift für Sexualwissenschaft, March, 1922.

COMPULSORY EVIDENCE AT INQUESTS.

As many coroners are medical men it may be of interest to note a point dealt with exhaustively by Mr. Justice Riddell recently in the Supreme Court of Ontario in an appeal in which the decision of a coroner was questioned. The point at issue was whether a man already in custody upon a charge of manslaughter in respect of a death into which the coroner was inquiring could be subpœnaed and compelled to give evidence at the inquest. Mr. Justice Riddell, after reviewing at length the cases decided in English courts on the subject, held that such a person had the right to give evidence and equally could be compelled to do so, and concluded by pointing out that the object with which the law is administered is to discover the actual facts for the public safety, the duty being laid upon every citizen to tell all he knows for the sake of the public at large. The question whether a person already committed for trial by magistrates, or in custody upon a charge of murder or manslaughter, can legally be compelled to go into the witness-box in a coroner's court in the same matter, appears, however, at any rate so far as this country is concerned, to be of academic rather than practical interest, because, although there may be questions which such a witness might properly be made to answer, they are necessarily few. This is because no such witness can be compelled to answer a question if the effect of his answer might be to criminate himself. Consequently, a person charged with the death, the subject of the inquest, is usually allowed, but not obliged, to be present, and allowed, but not obliged, to go into the witness-box.

TREATMENT OF GASTRIC CRISES.

Dr. Albert R. McFarland,[1] assistant in the section on dermatology and syphilology of the Mayo Foundation, draws attention to the helplessness of the physician and the abject misery of the patient during the gastric crises of tabes, in which hitherto hypodermic injection of morphia has been the only method which can control the pain and vomiting. The condition is often mistaken for gall-stone colic or some similar definitely organic cause, and the drug may have to be repeatedly employed before the true nature of the disease is discovered, by which time the habit of morphinism is well established. After experiments with many drugs and different methods of administration, Dr. McFarland has found that the most satisfactory mode of treatment, palliative only it is true, is the administration of chloral hydrate and sodium bromide in large doses by rectum. The results have been at least as good as those of morphia in the majority of the cases and the risk of establishing a drug habit has been avoided. A watery solution of chloral hydrate and sodium bromide in which half an ounce (15 c.cm.) of the fluid

[1] Journal of the American Medical Association, March 18th, 1922.

contains 40 gr. (2·6 g.) of each drug is allowed to flow slowly through a catheter introduced 6 in. (15 cm.) into the rectum. The room is then darkened and the patient is kept quiet in bed. In persons weighing over 150 lb. (68 kg.) as much as 60 gr. (4 g.) of each drug can be given. The injection is best given at bedtime. The method was tried by Dr. McFarland in 12 syphilitic patients with gastric crises, each of whom received from 1 to 15 injections, the average number being four. Definite relief from the pain and vomiting for from two to five hours was obtained in 76 per cent. out of 49 injections given, and in no instance were any injurious effects noted, although sometimes the injections were repeated as often as three times in the 24 hours, nor was immunity ever established, the last dose being apparently as effective as the first. Gastric lavage, which was employed in two cases, appeared to be a valuable adjunct to the treatment, especially when there was evidence of gastric distension.

THE LIBRARY PHOTOSTAT AT PHILADELPHIA.

THE library at the College of Physicians in Philadelphia contains a machine which is evidently proving of value to contemporary medicine in America. The apparatus, which is called the photostat, was installed five years ago in the library; it produces photographs of the same size and position as the original document, and at what the annual report of the library for 1921 describes as a minimum expense. Enlargements and reductions can be made without difficulty, while a book-holder connected with a movable carriage upon the front of the machine permits of copies being made of pages in bound books without injury to the binding. With the aid of the photostat Fellows of the College can obtain replicas of pages in books and articles in journals at a cost in many cases less than that of postage of the original to and from the worker. The photostat copy becomes the property of the person to whom it is sent, and the danger of loss or damage to rare books during transport is eliminated. During the year 1921 upwards of 1000 prints were sent out, some two-thirds of them to Fellows of the College, and the remainder to applicants in Chicago, Los Angeles, Pittsburgh, Washington, as well as in Great Britain and Germany. Besides this outside service, photostat copies are continually being made for library purposes of the incunabula and other irreplaceable works. We wonder that other large medical libraries have not followed the lead given by Philadelphia.

VENEREAL DISEASE LEGISLATION IN GERMANY.

THE new venereal disease law recently passed by the Reichsrat is the subject of a critical review by Prof. E. Galewsky,[1] of Dresden, President of the Deutsche Gesellschaft zur Bekämpfung der Geschlechtskrankheiten (D.G.B.G.) This law provides for gratis and compulsory treatment, instruction of patients in the subject of venereal disease by their doctors, prevention of quack treatment and treatment by correspondence, notification, and reform of the control of prostitution. Linked up with the privilege of free treatment is the obligation to submit to it by approved medical practitioners for as long as they consider it necessary. This provision for continuity of medical observation and treatment is one of the outstanding features of the new law which gives powers to the authorities to examine medically persons suspected of suffering from, or propagating, venereal disease. When such suspects are convicted of propagating venereal disease, the law provides for their compulsory detention and treatment in hospital. A term of three years' imprisonment may be the lot of the person who knowingly propagates venereal disease, and under certain conditions this penalty may even be increased. Penal clauses are also provided for various acts calculated to disseminate venereal disease, such as concealing the fact that a child put out to nurse is suffering from venereal disease. In the future it will be incumbent on wet nurses to hold certificates of health, and on their employers to inspect such certificates. With regard to professional prostitutes, police control is to be practically abolished, and so long as they do not disseminate venereal disease, they are to enjoy greater liberty than heretofore. But when they are suffering from venereal disease they come under the same system of compulsory continuous treatment as is imposed on other members of the community. With regard to the vexed question of notification, Prof. Galewsky discusses the three systems which have been advocated from time to time. As he points out, strictly anonymous notification is likely to be useful only for statistical purposes. Medical opinion in Germany is not opposed to this system, the administrative value of which seems to be doubtful. Wholesale nominate notification is a very different matter, and it would require the expenditure of millions and the appointment of a fresh horde of officials; in the end it would probably be very misleading. Many persons would give the wrong name and address, and, as Prof. Galewsky dryly remarks, Berlin would be found to be peopled by many thousands more Müllers, Meyers, and the like than figure on the census register. He seems to be more favourably impressed by the third system of notification, which is strictly confined to the patients who absent themselves from treatment. But even this system has its flaws, and it imposes on the doctor attending a case the unpleasant task of notifying to the authorities the patient's abstention from treatment. It is not clear from Prof. Galewsky's account which of these three systems of notification has become law.

[1] Deut. med. Woch., March 10th, 1922.

THE LEAGUE OF NATIONS HEALTH ORGANISATION.

A MEMORANDUM upon the Health Organisation of the League of Nations has just been issued, which explains in clear terms what that organisation is and how it works. The Health Organisation is provided for in the Covenant of the League (Article XXIII. (f)) and consists of three parts—a Committee, a Conference, and a Secretariat. The personnel of the strong Committee has been published on more than one occasion in our columns, while the Office International d'Hygiène Publique, a body with headquarters in Paris which existed before the war, serves as the centre of general conference. The Office International has not quite the same membership as the League of Nations, but its make-up and objects are sufficiently identical to enable it to draw up draft conventions and lay down general lines of policy. The Health Section of the Secretariat-General of the League is directed by Dr. Rajchman, who is ex-officio secretary-general of the Health Committee. The work immediately before the Health Organisation of the League is obviously the anti-epidemic campaign in Eastern Europe, which a recent health conference at Warsaw declared to be an urgent necessity. But the Genoa Conference will have to decide whether such a campaign is to be conducted in future by the Health Organisation of the League. The health conference at Warsaw was the direct outcome of a representation of the Polish Government to the Council of the League of Nations; and the unanimous recommendation of that conference was that the epidemic conditions in Eastern Europe must be dealt with, but the necessary funds have to be found, and it is hoped that some practical way out of the difficulty will be found at Genoa.

The memorandum of the League rightly calls attention to one valuable piece of international medical work already performed. In December, 1921, the Health Organisation held a meeting in London to decide on the standardisation of sera and serological tests, as the starting-point of a general inquiry, undertaken conjointly with the Office International d'Hygiène

Publique. Hitherto the various systems for measuring and testing the strength of antitoxins had been evolved independently of one another within different nations, and even by different doctors of the same nationality, thus causing much confusion. The creation of a uniform system of units of measurement was thus evidently a necessary piece of international medical coöperation, and only a body such as the League Health Organisation could have undertaken it.

THE PREVENTION OF ANTHRAX.

STATEMENTS have appeared recently to the effect that a method has been discovered of disinfecting wool, or other materials infected with anthrax, by the employment of ultra-violet rays. Anything that will prevent a very serious form of contagion must interest medical men, but we learn from the Home Office Committee on Anthrax that a test of the method was recently carried out by the Committee at Liverpool with unfavourable results. The apparatus was supplied and manipulated by the inventors, but samples taken from bales of wool subjected to the process showed, on being examined bacteriologically, that the anthrax spores had not been destroyed and that there was no indication of disinfection.

THE FEDERATION OF MEDICAL AND ALLIED SERVICES.

SPEAKING at the last annual dinner, Dr. Addison, in congratulating the Federation upon the progress made, said "it is a body whose aim is wide and public-spirited and marks a thoroughly wise departure from the usual purposes of professional associations." Recent developments have served further to emphasise this distinction from other organisations in the profession as well as to widen the scope of the Federation. Two special general meetings have just been held for the purpose of adopting certain resolutions involving additions to, and alterations in, the Articles of Association. Necessary formalities having been duly observed these changes now come into force. The general purpose they serve is to make the Federation in part an association of societies and in part also an association of individuals. Individual members are divided into two classes—Fellows and Associates—each electing representatives to the Executive Council. Any citizen concerned or interested in health is eligible for election as a Fellow or an Associate, the annual subscriptions being respectively one guinea and half a guinea, inclusive of the monthly journal *Health*. The position of the professional societies coöperating in the Federation remains unchanged. Their number has increased considerably and their representatives constitute the two professional Councils, one known as the "Medical Council" and the other as the "Council of Allied Professions." These Councils are the chief source of authoritative knowledge in the Federation.

To conform with these changes, for hitherto membership has almost entirely been confined to societies and kindred bodies in the medical and allied professions, the final word of the title of the Federation has been changed from "Societies" to "Services." Twelve months ago the initial steps were taken to form a "Citizens' Council" representative of lay organisations and individuals interested in the health of the nation, whose views would assist the professions to a full understanding of the needs of the people. This Council also has made satisfactory progress, largely owing to the interest taken in it by Lord Islington, who has accepted the office of chairman. The hon. secretary of the Council is Mr. Henry Lesser, LL.B., President of the Federation of Employees' Approved Societies—one of the bodies coöperating in the Council. Valuable assistance has been offered also by the Federation of British Industries and other bodies representative of commerce and industry.

The objects of the Federation remain unchanged and may be stated as follows: To provide the means whereby societies and individuals in any way interested in health may meet to form and express, in the interests of the community, considered and collective judgment to guide the formation of public opinion; to protect the community against ill-advised or misdirected legislation affecting health; and to assist in securing for the nation adequate representation in Parliament of professional opinion on health. With a steadily increasing membership, and a journal devoted to its interests, the Federation has, we believe, a sound prospect of seeing its aims realised.

REPEATED CÆSAREAN SECTIONS.

Dr. Thomas O. Gamble,[1] of the obstetrical department of the Johns Hopkins Hospital, has recently made a clinical and anatomical study of repeated Cæsarean sections, with special reference to the healing of the cicatrix and to the occurrence of rupture through it. His article is based on 63 pregnancies occurring in 51 women who had been subjected to Cæsarean section. In 45 cases a second or third section was done, vaginal delivery occurred in 17, and rupture of the old Cæsarean scar in one. Dr. Gamble discusses in detail the various factors in the production of a thin imperfect scar and the conditions predisposing to its rupture, classifying them under the following headings: (1) infection, (2) improper suture technique, (3) unsuitable suture material, (4) site of the uterine incision, (5) involvement of the placental site at the operation, (6) implantation of the placenta over the scar with inversion of the fœtal elements, (7) miscellaneous causes, such as excessive distension of the uterus by hydramnios or multiple pregnancy, and forcible intra-uterine manipulations. The gross mortality in the present series was 5·9 per cent., the three deaths being due to hæmorrhage in one instance, and in the others to the repeated abdominal operation. It is the practice at the Johns Hopkins Hospital to sterilise the patient at the third operation instead of doing five or six repeated Cæsarean sections, as is the practice of some obstetricians. This may help to explain the low incidence of ruptured scars, for the greater the number of sections done upon one woman the greater will be the number of imperfect scars. Dr. Gamble recommends that a patient who has once undergone Cæsarean section should enter the hospital several weeks before the expected date of her confinement, so that she may have the benefit of immediate operation should rupture occur.

THE course of lectures delivered last summer at St. Mary's Hospital, Paddington, under the general heading Pathological Research in Relation to Medicine was so widely appreciated that the Institute of Pathology and Research has arranged for a second series. On April 27th Sir Almroth Wright, principal of the Institute, delivered the inaugural address on New Avenues in Immunisation. Subsequent lectures will be given on Thursdays, at 5 P.M., in May and June in the lecture room of the bacteriological department of the Institute by the following:—

May 4th: Sir Archibald E. Garrod, on More Inborn Errors of Metabolism.

May 11th: Prof. G. Elliot Smith, on the Anatomy of Anxiety.

May 18th: Major-General Sir W. B. Leishman, on Enteric Fevers in the War.

May 25th: Prof. E. H. Starling, on Some New Experiments on the Kidney.

June 1st: Sir Alexander Houston, on the Purification of Water.

June 8th: Prof. William Bulloch, on the Historical Development of the Doctrines of Croup and Diphtheria.

June 15th: Sir Berkeley G. A. Moynihan, on Diverticula of the Alimentary Tract.

The lectures are open to all members of the medical profession and to all students in medical schools without fee.

[1] Johns Hopkins Hospital Bulletin, March, 1922.

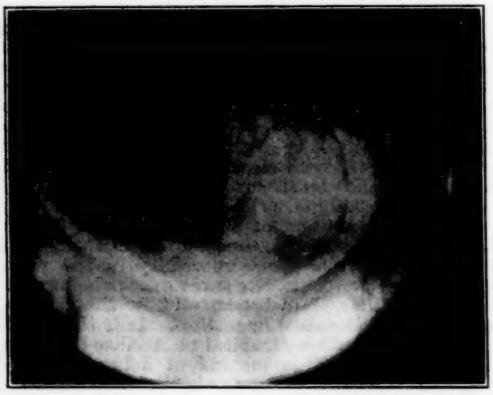
X RAYS IN OBSTETRIC PRACTICE.

BY EDWARD W. H. SHENTON, M.R.C.S.,

RADIOLOGIST TO CENTRAL R.A.F. HOSPITAL; LATE SENIOR SURGICAL RADIOGRAPHER, GUY'S HOSPITAL.

THE X rays have penetrated into so many branches of medicine and surgery that, at first sight, it seems curious that obstetric practice should be almost excluded. Pelvic deformities are not difficult to detect thereby, and yet, in my experience, the aid of the rays is seldom called in. The region is a difficult one from the radiographical point of view, but it is generally possible to get useful data even if the resulting skiagrams do not rank as show pictures. I have previously pointed out how, even in a poor radiogram of the hip region, the essential lines of the upper margin of the obturator foramen and the inner margin of the femoral neck will show whether there is fracture in this region by the intactness, or otherwise, of the arch formed by these two lines, and few radiograms, however faint, will fail to show these essentials. Surgeons of the present day ask for radiographic results which in their clarity would almost satisfy a common jury. They are certainly right to demand the best proofs obtainable, but I venture to think that a great deal of the more subtle and less obvious evidence is overlooked, or ignored, on this account.

FIG. 1.



Radiogram showing relation of fœtal head to pelvis in a case in which induction of premature labour had been suggested.

In dealing with obstetrical findings one must not expect to see everything as plainly as a fractured tibia in a stereoscope. We are hampered chiefly by two conditions when radiographing the fœtus in utero. The first is the quantity of fluid, a relatively opaque medium, and the second is the paucity of mineral matter in the fœtal bones. The mineral content varies according to the age of the fœtus, but probably it will be difficult or impossible to deal with any case before the fourth month of pregnancy, and I think the fifth or the sixth will usually prove to be the earliest.

If an image, however faint, of a fœtus can be obtained, the uses of the rays are so obvious as scarcely to need enumeration—e.g., to determine (1) the presence of a pregnancy or abdominal tumour; (2) the position of the fœtus; (3) the relations of head and pelvic canal; (4) twins.

I think any gynæcologist will admit that the present methods of measuring pelvic dimensions are rough-and-ready; furthermore, the relative measurements of fœtal head and the mother's pelvis are of much greater value than absolute measurement of either. Fig. 1 shows this. The patient had a small pelvis, and it was decided to induce premature labour. From this radiogram I gathered there was room and to spare. Mr. Harold Chapple, who had charge of the case, accepted the radiographic evidence, and let the case go to full time. Labour was normal and the child healthy.

This suggests a possible criticism—Are the rays in any way detrimental to the baby? I should say without hesitation "No," both from practical as well as theoretical considerations. No harm has resulted in any case examined, and, considering the protection by fluid, as well as soft tissues, it is impossible to believe that any detrimental amount of X rays could reach the child. Furthermore, newly-born babies show no special susceptibility to X rays, although they are frequently examined for swallowed foreign bodies, pyloric obstruction, and various other reasons.

The second radiogram (Fig. 2), taken between the seventh and eighth months of pregnancy, shows a position of the fœtus unsatisfactory to the obstetrician, but one which was easily rectified when understood.

It is exceptional to get photographs good enough for reproduction. The initial difficulty is to secure any image of the fœtus at all, but with up-to-date appliances and the latest photographic helps I think any case can be dealt with sufficiently well to give the obstetrician the guidance he wants. And this is no little advance. A short time ago I had a case of early pregnancy, ? fourth to sixth month or ? abdominal tumour. The clinical facts seemed to be evenly balanced. An unmistakable, though faint, backbone in the first radiogram encouraged further investigations, which resulted in a complete fœtus being demonstrated. It may prove possible, I hope, to determine by radiography the exact date of pregnancy.

FIG. 2.

Radiogram showing abnormal position of the fœtus, which was easily rectified after X ray demonstration.

As some guide to technique, I would suggest antero-posterior position for head and pelvis, the latter being tilted so as to give a comprehensive view of the pelvic canal. Stereoscopy is useful if practicable. For the abdomen the lateral position, the patient lying on her side. The plate must be large, and come well over crest of ilium. Intensifying screens and other aids to rapidity in the photographic process will be essential.

I have to thank Flight-Sergeant Pattison of the R.A.F. Central Hospital for his photographic help.

THE LATE DR. W. J. C. MERRY.—The death occurred on April 13th of Dr. Merry, of Eastbourne, who had resided in the borough for over 20 years, and will be missed by a large circle of patients. During the war he did valuable work at the military hospital and also at the De Walden Court Red Cross Hospital, and for his services was made an O.B.E. Dr. Merry took the B.A. degree at Oxford in 1889, and became M.A. in 1893. In the same year he qualified M.B., B.S., and took the M.D. Oxf. in 1896. His medical studies were undertaken at St. Thomas's Hospital, where he became successively house physician and house surgeon, and in Vienna. He was 56 years of age at his death.

THE TEACHING OF PUBLIC HEALTH: REFORM OF THE D.P.H. CURRICULUM.

SOME 27 years ago the General Medical Council directed an inspection of all the examining bodies granting degrees or diplomas in public health in Great Britain and Ireland; since then no further investigation has been made as to the sufficiency of these examinations until 1920, when the Council appointed Dr. R. Bruce Low to visit all these examining bodies and to report upon the nature and scope of the examinations. From a volume[1] just issued, entitled "Addendum to Minutes of the General Medical Council, Inspection of Examinations," comprising some 839 pages, of which 389 deal with the diploma in public health; we learn that following upon the reports received, the Council, through their public health committee, have drafted a fresh series of resolutions and rules for diplomas or degrees in public health, sanitary science, or State medicine, to take the place of those hitherto in force. The new series has been approved by the Council and has been submitted to each of the examining bodies for their observations. It is expected that at the next half-yearly meeting of the Council in May the resolutions and rules will be finally dealt with, after which a date for their coming into force will be fixed.

History of the Public Health Diploma.

More than 50 years ago Trinity College, Dublin, established a diploma in State medicine, and shortly afterwards the University of Cambridge instituted an examination for a certificate in sanitary science. Other examining bodies gradually followed this example and now there are no fewer than 21 bodies which grant degrees or diplomas in public health in England, Wales, Scotland, and Ireland. Although, we learn, that these examining bodies are performing their duties satisfactorily and efficiently, yet there are differences among them as to the scope and methods of the examination; in some, certain subjects are regarded as of the most importance, while in others different subjects are held to be of more consequence. It is desirable that there should be uniformity in the details of these examinations so that as far as possible some approach may be made to the desideratum of a one portal system, and this we understand is provided for in the new regulations, so that in future all candidates for admission to the public health service shall undergo the same tests. The possession of a diploma in public health is now regarded as a sine qua non for those who aspire to the office of medical officer of health; for that reason it is desirable that the standard of the examination should be the same in all cases, that it should be kept high, and that it should not be possible for anyone to allege that the examination was easier in one place as compared with another.

In recent years there has been a remarkable extension in the scope of public health, and at the same time there have occurred notable developments in the science and practice of preventive medicine. Parliament has been passing laws which have placed new and onerous duties and responsibilities on local sanitary authorities and their medical advisers, and it seems not unlikely that future sanitary legislation will impose fresh burdens on the shoulders of medical officers of health. The education and training of candidates for that office therefore becomes a matter of almost national importance, since upon the efficiency of local medical officers of health may depend the health, and even the lives, of the populations under their charge. In view of the widened scope of public health the revision of the Council's rules and regulations became necessary, and accordingly the new regulations require systematic instruction and examination in a number of fresh subjects not formerly included in the curriculum, such, for instance, as the administrative control of tuberculosis, venereal diseases, maternity and child welfare, medical inspection of school children, medical entomology, and parasitology. A more thorough and prolonged course of instruction is now required for acquiring a proper knowledge of the duties, routine and special, of a medical officer of health, a point in which the previous regulations were somewhat weak; systematic instruction must also be given in a variety of other subjects, including vital statistics, epidemiology, sanitary law, advanced hygiene, sanitary construction and planning, &c. Certain practical tests are to be applied to the candidates in all cases, including his knowledge of meat inspection and food control.

Significance of the Enlarging Curriculum.

These additions to the curriculum have made it necessary to increase its minimum duration from nine months to 12, and a further provision is added that no candidate can be admitted to the final D.P.H. examination until after the lapse of not less than two years (instead of one as formerly) from the date of obtaining a registrable qualification in medicine, surgery, and midwifery. The reason for this last stipulation appears to be that in the past many candidates have proceeded direct to their D.P.H. studies as soon as they became medically qualified. It was therefore possible for them after obtaining the D.P.H. to be appointed medical officers of health without having had any opportunities for acquiring experience in clinical medicine other than that received in their student days in the hospital wards, where mostly advanced and typical cases of various diseases are admitted for teaching purposes, but where the students see nothing of the beginnings of the diseases which as medical officers of health it would be their duty to prevent. Neither had these candidates had opportunities for seeing the domestic tragedies caused, for instance, by tuberculosis, cancer, and syphilis, in the contemplation of which their best sympathies with human suffering would be awakened and their zeal increased in the cause of prevention; nor had they had the chance of gaining and using that tact which is so essential in a medical man dealing officially with his fellow practitioners, and without which his usefulness is likely to be much impaired. The additional year required by the regulations affords the opportunity of increasing the candidate's clinical knowledge, and gives him time to learn by experience at least a little of how to deal with all sorts and conditions of men.

The increased scope and stringency of the Council's new regulations for the D.P.H. cannot fail to have a beneficial effect on the future health of the nation, and for this reason the reform of the D.P.H. curriculum will be welcomed by all thoughtful members of the medical profession, and more especially by those whose time and energies are specially devoted to public health and preventive medicine. What effect the establishment of the new London School of Hygiene, to be erected by funds supplied by the munificence of the Rockefeller Foundation, may have on the courses of instruction for the D.P.H. in the future it is not possible at present to say; although a site has already been acquired in Gower-street, it will probably be some time before the new school can be built and be ready to begin its educational work on a large scale. It appears to us, however, that the concentration of high-class public health teaching in a suitable school maintained by Government will open up great possibilities for advancing the education of future medical officers of health.

DISCUSSION ON THE REVISED CURRICULUM AT THE SOCIETY OF MEDICAL OFFICERS OF HEALTH.

At a meeting of the Society of Medical Officers of Health, held at 1, Upper Montague-street, London, W.C., on April 21st, with Dr. W. J. HOWARTH, the President, in the chair, a paper was read by Dr. HAROLD KERR (M.O.H., Newcastle-on-Tyne, and professor of hygiene in the University of Durham)

[1] Published and sold for the Council by Constable and Co., Ltd., 10, Orange-street, London, W.C. 2. 7s. 6d.

on the proposed revision of the rules of the General Medical Council for diplomas and degrees in public health.

Prof. Kerr dealt with the draft rules which had been proposed by the Public Health Committee of the General Medical Council, and were down for consideration by that Council in May. They were, he said, largely founded upon the full and able report of Dr. R. Bruce Low, who had inspected the examinations at 21 medical schools in Great Britain and Ireland which granted such degrees and diplomas. The report was marked by wholehearted sincerity, intimate knowledge of the duties of a medical officer of health, and ambition for the welfare of their branch of the profession. Prof. Kerr went on to point out the enormous expansion in the scope of State medicine, each development demanding of the administrative officer knowledge of yet another subject. His limitations had already been admitted by the creation of various groups of allied clinical and laboratory specialists; but always the M.O.H. must have sufficient knowledge of each branch to coördinate the various efforts to a single end. The problem was not how much should he know of how many subjects, but what was the least equipment with which it was legitimate to turn him out as qualified to devise and guide the machinery for disease prevention. In the past there had been instances of looseness in awarding diplomas, and candidates had been approved whose knowledge was, to say the least of it, sketchy. The standard of examination was now higher, and there was a heavy mortality amongst candidates. They were all desirous of seeing "plucked" the undesirable type of aspirant who was after a soft job and did not take the course seriously. Another type was the keen but green youth who took the examination simply to gain an extra diploma, the value of which was often merely speculative. A third type was the man engaged in private practice or other arduous work who had insufficient time to devote to study, and who could not acquire an adequate knowledge of the subject. Dr. Bruce Low emphasised all these points, and it was satisfactory to note that the draft rules prescribed an interval of not less than two years between qualification and admission to the final D.P.H. Training was to extend to 12 calendar months (not merely an academic year), but Prof. Kerr regarded it as a weakness that the attendances might be spread over a prolonged period, and whole-time study was not insisted on. He considered that it should be made whole-time, unless the other occupation was in a public health department.

Details of the Proposed Alterations.

Prof. Kerr then gave details of the proposed alterations in the curriculum.

There would be required for Part I. 180 hours in bacteriology (150 in practical laboratory work), and 90 hours in chemistry and physics (70 in the laboratory). Parasitology and entomology would be specifically included with bacteriology. For Part II. there would be demanded three months' attendance at a fever hospital, with 30 attendances not less than twice a week; and six months' practical work (which could not be reduced) with a M.O.H., on at least 60 days of three hours each, the instruction to include maternity and child welfare, school medical service, venereal disease service, tuberculosis service, industrial hygiene, and the inspection and control of meat, milk, and other food. There would also be required instruction from approved teachers extending over not less than 100 hours in the principles of public health and sanitation (30), epidemiology (20), sanitary law and administration (20), sanitary construction and planning (12), vital statistics (10), and meteorology and climatology (8).

Their Effects on the Public Health Service.

Prof. Kerr agreed that these conditions would go far towards ensuring a high standard, with advantage to the State and the prestige of the service. But he suggested that they would result in a large decrease in the number of entrants, especially seeing that, however attractive public health work was to many, the conditions of remuneration were worse than in almost any line in medicine. The service had lost considerably in popularity, especially since the war. During the past ten years 1556 candidates had obtained the diploma, and there had been 27 per cent. of failures in Part I. and 25 per cent. in Part II. It was estimated that in England and Wales there were about 340 whole-time M.O.H.'s and 1150 whole-time subordinate medical officers (school children 830, maternity and child welfare 56, tuberculosis 250, and venereal disease 15). The chances of the entrant becoming a chief was less than one in three, even if he had patience to wait his time, and the subordinate posts, though they were truly responsible, carried a remuneration which was attractive to none but junior men. Comparatively few of the M.O.H.'s themselves received a salary equal to the income which was well within the reach of the most mediocre panel practitioner.

Under these conditions Prof. Kerr questioned whether the raised standard for the D.P.H. would secure a sufficiency of men of the character required, in which case he feared that the public posts, especially the clinical ones, would go by default to men with no public health training at all. He suggested that the proposed laboratory requirements for Part I. should be greatly reduced and lecture-demonstrations added. The object was not to produce an expert practical chemist and bacteriologist. In regard to Part II., he explained the importance of the practical work with a M.O.H. and at a fever hospital, and suggested that the experience could be best obtained by the actual attachment of the student for six months to the staff of the public health department in the fever hospital, maternity centres, tuberculosis section, or bacteriological laboratory. He also suggested that the proposed 100 hours of lectures should be dropped. With a proper practical course they would be superfluous, and no one but a M.O.H. in active work could so keep abreast of the times as to make the lectures valuable—and he could not spare the time. He also raised the objection that such "spoon-feeding" was harmful, and that the student should be made to seek and obtain much of his instruction for himself.

In conclusion, Prof. Kerr reiterated that there were not likely to be the diplomates forthcoming if things were made too difficult for the candidates and those who had to train them, and if the material attractions of the service were not substantially improved.

Discussion.

Dr. D. C. KIRKHOPE (M.O.H., Tottenham) congratulated Prof. Kerr on the temperate manner in which he had handled the two sides of this question. The points of view of the teacher and of M.O.H.'s were not the same. At present there was a flood of applicants for any subordinate position (unless indeed the journals refused to accept the advertisement on account of lowness of salary), and so long as the supply exceeded the demand conditions were not likely to improve. If the proposed rules for the D.P.H. were adopted they would have the effect of diminishing the supply of applicants. Only recently he had heard that in a certain district the medical practitioners declined to recognise the M.O.H. as in any sense a specialist. This ought to be altered by making the D.P.H. more difficult to obtain, and therefore a higher qualification. He did not consider that 100 hours of lectures was the best method of instructing post-graduate students who had already been through long courses of lectures in obtaining their medical qualification; nor did he consider it a good plan to attach students for six months to the staff of a public health department.

Sir W. R. SMITH (Royal Institute of Public Health) said that while no doubt the draft regulations were a great advance, yet the difficulties which would be met in carrying them out had to be faced. Especially had the part which the M.O.H. had to play in instructing students to be well considered, and the views of local authorities had to be taken into account in this connexion. This was a particularly difficult question in London. The present system of four months of laboratory work was quite insufficient.

He questioned the utility of making the students put in attendances at fever hospitals in the present manner. That part of the work could only be learnt by residence at the hospital, and he had been concerned in the scheme whereby the students could be appointed at the M.A.B. hospitals as resident clinical assistants, receiving no pay but being charged nothing for board and lodging. This scheme had been dropped through lack of applicants.

Prof. H. R. KENWOOD (University of London) said that he was largely in accord with Prof. Kerr. The increase in the burdens proposed to be imposed on students and training institutions and instructors presented a difficult problem. From the point of view of the Society of M.O.H.'s, they might welcome a decrease in the number of new D.P.H.'s in its bearing on their conditions of employment. But there was also the standpoint of the instructors, and, while they would welcome greater completeness of training, still they had to be practical. All D.P.H. training centres were already a considerable financial loss to the institutions concerned, the fees not nearly paying expenses. If expenses were increased and the number of candidates diminished, how were the training centres to continue? Many would drop out. With regard to attendance at fever hospitals, he agreed that it would be most important *if it were made valuable.* That is where the new regulations might fail—they would tend to encourage mere "window-dressing." The intention was that students should learn hospital management, and not merely diagnosis. They got nothing of the sort, and their time was wasted. The scheme for 100 hours' lectures he considered quite wrong. Post-graduate students could get what they needed from text-books, and at his training school he followed that principle, supplemented by tutorial classes and discussion amongst the students. At the first blush the work with a M.O.H. was most important, but in his experience this was the most unsatisfactory part of all, the students rarely being taken over the whole course. He was in favour of larger classes for practical instruction on a set programme in important centres. It was an improved system that was wanted, not a lengthened course.

Dr. E. H. T. NASH (M.O.H., Wimbledon) remarked that there had been three recent instances where tuberculosis officers, without general experience of the work of a M.O.H., had been appointed as county M.O.H.'s. He agreed that the fever hospital courses tended to be a farce. It was most important for the M.O.H. to be fully conversant with hospital administration, and also to be expert in the diagnosis of fevers in order that he might be available as a consultant in this respect. He also thought that more time should be given by the student to meat inspection. He feared that the proposed regulations would freeze out the man who desired to take the D.P.H. course while still earning his own living. He was often a most useful man, and there should be an opening for him. Dr. Nash considered that the financial difficulty in regard to the draft rules would be overcome by grants from the Board of Education.

Dr. T. SHADICK HIGGINS (M.O.H., St. Pancras) also expressed the view that no kind of fever hospital instruction was of much use unless the student were resident in the hospital, even if only for three months. He agreed with Sir W. R. Smith as to the desirability of clinical assistantships being granted for this purpose. If the student could get a paid post in the hospital, so much the better. It was a most valuable thing from the point of view of prestige if the M.O.H. were able to act as a consultant in doubtful cases of infectious disease. With regard to instruction in the work of a M.O.H., he had found that, although the teaching work was most interesting and attractive, it was difficult for the M.O.H. of a large district to find the necessary time to give to it. If the M.O.H. were relieved of some of his routine detail he could greatly improve his course of instruction, which would go far towards a general improvement in the D.P.H. course.

President's Summing Up.

The PRESIDENT, in thanking Prof. Kerr, said that there was unanimity in the opinion that a higher standard for the D.P.H. was desirable. He felt that it was not for them to consider the difficulties from the point of view of the training schools, and that they ought not to take exception to the findings of the General Medical Council on such grounds. He was not in favour of the suggestion that students should be attached to the public health departments. If that were done their instruction would be "chancy," nor would they prove of real value to the M.O.H. He would substitute for the present "outdoor" course a more intensive course on a syllabus to be laid down by the General Medical Council. Many M.O.H.'s could and would take such courses for (say) 10 students, but for a much shorter period than six months. He agreed that it was important for the D.P.H. candidate to have adequate instruction at a fever hospital.

TUBERCULOSIS.

EMPLOYMENT OF THE TUBERCULOUS EX-SERVICE MAN IN CANADA AND AT HOME.

THE increasing urgency of the problem of employment for patients suffering from tuberculosis following their discharge from sanatorium finds expression in a recently issued pamphlet on "The Care and Employment of the Tuberculous Ex-Service Man after Discharge from the Sanatorium," a report submitted by the Board of Tuberculosis Sanatorium Consultants to the Director of Medical Services in Ottawa. There will be few to cavil at the conclusions reached by the Canadian Board. The limitations of sanatorium treatment, the necessity for care and supervision after discharge, the linking-up of the sanatorium with other agencies in the treatment of the disease, the recognition that tuberculous labour seldom pays, and the necessity for a State-subsidised scheme of work in the form of sub-standard workshops, colonies (agricultural, industrial and combined), and permanent community settlements, all receive emphasis and are made the subject of definite recommendations to the Government department concerned. Due acknowledgment is paid to British enterprise in the development of the colony idea, particularly the schemes in operation at Papworth and Nayland, though others equally deserving of mention have not been touched upon. These schemes have encountered certain criticisms, which no investigator can afford to ignore, but of this the Canadian Board seems to be unaware.

In the absence of Canadian experience of colonies and settlements it is not easy to draw any useful parallel with work in this country. Canada, unlike this country, has a lack of specialists in the treatment and care of tuberculosis. There a large but very scattered population may come to be served by a single sanatorium without any predominating city accommodating the bulk of the population. Under these conditions a more intimate correlation between sanatorium and post-sanatorium medical supervision is greatly to be desired. Such correlation already obtains to some extent in this country in those instances where a residential institution is under the charge of a medical superintendent who is also the tuberculosis officer of the area which it serves. Where the duties are such as can be efficiently performed by one man, he, as medical superintendent, will quickly discover that the apportionment of patients to an institution by the tuberculosis officer is governed by other considerations than the simple one to which he is at first inclined to pay most attention—namely, that the patient is an "early" case and, therefore, a suitable one for treatment. He will learn what, perhaps, in his seclusion, he had not dreamed of before, that at times the tuberculosis officer is up against some ancient tags or almost forgotten perorations, conveniently ignored nowadays by the ingenious minds who originated them, which, none the less,

remain remarkably fresh in public memory, and are used in the most determined way to force an entrance into the portals of a jealously guarded institution.

Selection and Disposal of Cases.

On the other hand, as tuberculosis officer, the superintendent of the tuberculosis sanatorium will come to realise the extreme inadequacy of the sanatorium to deal with every case he would like to send there or which demands treatment more or less as a right. The cases suitable in the opinion of the medical superintendent for treatment in a sanatorium are difficult to select. If it be true, as some observers hold, that 30 per cent. of "early" cases are not suffering from tuberculosis at all, a month or two at the seaside, without restrictive regulation, would probably suffice to restore or maintain working capacity, and to render admission to the sanatorium unnecessary. The view of the superintendent would be modified by the experience of the tuberculosis officer. Faced with the ever-recurring problem of how to deal with the genuine sufferers for whom mere summer-time disposal would be inadequate, the tuberculosis officer has often to fall back on the Poor-law, which, in spite of all the prejudice which invests it, is still with us, or incur the censure of an authority which has itself failed to provide a staff to look after patients who are unable to make their beds or polish bathroom taps. In this country we have plenty of tuberculosis specialists, who have acquired their special qualifications without the government aid which the Canadian Board recommend as an encouragement to their graduates and undergraduates to undertake the work. It might be wise for Canadians to study somewhat carefully the position of these fellow-workers who, having paid dearly for their own training, now find themselves in something of a cul de sac, with an uncertain career before them and in receipt of a salary hardly more than that paid to Poor-law relieving officers.

Wider Application of Recommendations.

One other point, and that a general one. The recommendations made by the Canadian Board in regard to ex-Service men and by all similar boards in this or other countries, have a much wider application. It appears to many an unjustifiable anomaly that all the enumerated benefits, after-care, workshops, settlements, and the rest, should be so insistently urged in the case of the ex-Service man and so generously accepted by the governments concerned, while the civilian is left to fend more or less for himself, or is handed over to a voluntary care association doing its best with no authority and but limited funds and scope. The essential conditions for treatment attach to the disease, not to the incidental circumstance that the patient served in the forces. There can be no question but that the preferential treatment meted out to the ex-Service man and his dependents has been of incalculable benefit to large numbers, enabling them to supplement the financial disadvantages of a so-called "light" occupation, to maintain themselves and their families in comfort and security, or, when occupation has become impossible, prolonging life and mitigating the agony of death. If these things be deemed a sufficient reward for the expenditure incurred, how much greater would that be if the civilian, man and woman, were similarly provided for! Actually the problem is one of a large section of the population, in which both ex-Service men and civilians are included. They suffer from a disease the care and treatment of which demand more and more insistently to be placed on a comprehensive basis, to take the place of the imperfect and overlapping methods which exist to-day, one in which each individual is entitled to the share which at present is meted out only to one small class. That is the problem which all governments will, sooner or later, be called upon to face.

Dr. S. A. Kinnier Wilson has been elected an Honorary Fellow of the Royal Academy of Medicine of Turin.

INDIA.

(FROM OUR OWN CORRESPONDENT.)

Madras Medical Association.

THIS Association, founded by the Civil Assistant Surgeons of the Madras Provincial Medical Service, recently drew up a memorandum embodying certain grievances to be placed before the Government of His Excellency the Governor-in-Council. This memorandum refers to (1) Post-graduate leave and study leave.—Prior to 1920 assistant surgeons had to pass two septennial examinations before promotion to the higher two grades, "a state of affairs which was keenly resented by the members of the service." The Public Services Commission recommended the abolition of these examinations, and a system of junior and senior post-graduate courses was instituted. Assistant surgeons now complain that the new courses are not what they expected, and that examinations are still being held. They maintain that "the holding of periodical professional examinations is quite unnecessary, if not even humiliating," and point out that a similar practice once in force for I.M.S. officers was long ago abolished. They therefore ask that a system of study leave be instituted for the members of their service. (2) Nomenclature.—The term "civil assistant surgeon" has long been objected to, and the memorandum requests that it be now finally abandoned, and that the members be styled "officers of the Madras medical service." This has very recently been given effect to. Other requests relate to pay and prospects, travelling allowances, and the position of temporary assistant surgeons.

The Madras Budget for 1922–23.

Like every country in the world and every other province in India, Madras is at present in the throes of a financial crisis. A finance committee composed of members of the Legislative Council sat for some weeks before the budget meeting, and made drastic "cuts" in every direction; the medical budget was so depleted that it is difficult to see how the department is to carry on. In any case it will be necessary to close down a large number of beds in the Government hospitals. All expansion of work is out of the question for the time being; the scheme—projected for 20 years—for building a new general hospital and medical college in Madras city must be considered as shelved, and those acquainted with conditions in the present hospital and college will bitterly regret the dilatory treatment the new scheme has received. Fresh taxation must apparently be avoided at all costs, even if it entails the sacrifice of efficiency. When the public health grants were taken up some criticism was made regarding the appointment of two additional assistant directors of public health, but fortunately the two new appointments were sanctioned. The grant for employing assistant surgeons to give public lectures on health subjects in the district towns and villages was deleted by the finance committee before the budget reached the House, as also the greater portion of the grant required for the part payment of the salaries of municipal health officers. On the whole, however, the public health grants were considerably less mutilated than had been feared.

X Ray Institute.

On March 17th H.E. Lady Willingdon formally opened the Government X Ray Institute at the General Hospital; H.E. the Governor presided over the meeting in connexion with the ceremony. Among the visitors were the Hon. Mr. P. Ramarayaningar, Minister in charge of the Medical Portfolio, Surgeon-General G. G. Giffard, and many local medical officers and practitioners. Col. T. H. Symons, I.M.S., superintendent of the General Hospital, referred in an address to the fact that the South Indian Branch of the British Medical Association was

the first to introduce an X ray apparatus into India. Madras secured its first X ray outfit for use at the General Hospital about 1900; since then more modern outfits had been obtained, constant improvements had been made, and the General Hospital had been able to produce excellent results both as regards radiography and treatment. In 1920, in order to place the Presidency in the forefront in the matter of radiography and its kindred sciences, the services of a trained radiologist were secured; the Institute was at present almost complete, and would form a large teaching centre for the Presidency. It was hoped to train assistant surgeons, who would go out into the mofussil and there carry on X ray examinations and treatment, but at present there were only two complete sets of X ray apparatus outside Madras, one at Ootacamund and one at Madura. Col. Symons went on to say that the Institute now lacked only an apparatus for deep X ray treatment, so essential for dealing with deep-seated cancer. The cost of such an apparatus was about Rs. 20,000, and if some benefactor would make a present of this sum the hospital would be in a position also to fight cancer. Surgeon-General Giffard in a short speech outlined the urgent needs of the Medical Department in Madras, and appealed to members of the Legislative Council to meet these needs as generously as possible.

The Institute now contains a complete ionic medication department; two sets of baths in curtained compartments with the necessary apparatus for the treatment of rheumatism, stiff joints, chronic ulcers, &c.; departments for X ray treatment, fluoroscopy, and radiography, together with a studio, dark room, and office. The number of examinations and treatments carried out in the Institute during 1921 totalled 7315, as compared with 2345, 2531, and 3465 in the years 1918, 1919, and 1920 respectively.

Anti-Hookworm Campaign in Madras Presidency.

The active campaign against hookworm disease was commenced in Madras Presidency on April 7th, 1920, with the help of medical workers from the Rockefeller Foundation. Since that period several different classes of community in different districts have been examined and treated.

1. The first piece of work was undertaken in the Cannanore Central Jail, which had a population of a thousand or more inmates representing practically every district in the Presidency, although the great majority were, of course, from the West Coast Districts of Malabar and South Kanara. Microscopic examination of specimens received from 964 inmates was carried out; 865 were found to contain ova of the hookworm, giving an infection rate of 89·7 per cent. Of the 99 convicts who gave negative results, 80 had received treatment before the examination was made. Of specimens from 197 later admissions to the jail, 196 were found to contain hookworm ova, giving an infection rate of 99·2 per cent. Of 20 women examined 19, or 95 per cent., were infected with the parasites. A table of infection rates according to districts was drawn up, and it was made clear that hookworm incidence in the Presidency is enormously high, especially in the wet districts. A routine method of treatment was adopted, and treatments were administered at about 9-day intervals, the total number of treatments given being 2844. Examination of specimens showed that two treatments rendered 86·9 per cent. of those treated free from hookworm, three treatments 93·9 per cent., and four treatments 100 per cent. The inference drawn from the jail campaign was that, with the drug and method employed, two treatments render the individual safe, as even in cases incompletely cured the worms were reduced to 10–15 per cent. of the original numbers. If this satisfactory figure were secured in all hookworm control work, with improved sanitation and with treatment every six months, the hookworm menace would be practically under control. This work, completed in two and a half months, proved that in a short space of time with a very small staff and with a minimum of interference with general routine, a large group of persons may be rendered hookworm safe.

2. Investigations made as to the prevalence of hookworm infection amongst the inmates of the headquarter hospitals in Madura, Vizagapatam, Malabar, and Kistna also gave interesting results. One thousand and fifty-five patients were examined, and of these 828, or 78·48 per cent., were found to be infected.

3. Among coolies working in the tea estates in the Wynaad and Nilgiris, representative groups were selected, a large number of these examined being Tamils from Coimbatore district, one of the driest districts in the Presidency. The incidence of infection amongst these was 83 per cent., whilst that of coolies from the wet districts of Malabar and South Kanara was 100 per cent. A very large percentage of coolies showed every sign of severe infection. The cure-rate after three treatments was 78 per cent., but among the lightly infected Tamils it was much higher.

4. An industrial centre was then selected, and a campaign was commenced at the Buckingham and Carnatic Mills on Nov. 15th, 1920, operations being closed on June 20th, 1921, when the workers went out on strike. In the joint schools maintained by the mills, 609 persons were examined, 574 specimens being received from pupils and 35 from Indian teachers. Among the teachers the infection was only 15·8 per cent.: among the children it was 55·7 per cent., the difference being doubtless due to the better living conditions enjoyed by the former.

5. Work was begun at Ranipet in the North Arcot district on Dec. 8th, 1921. Messrs. Parry and Co. requested that an investigation should be made amongst their factory employees, and it was hoped that, with the help of the American Arcot Mission and various other organised bodies, it might be possible to conduct an educational campaign throughout the district. Up to Dec. 31st, 229 examinations were made of persons from the various departments of the Presidency Manure Works. Of these 209, or 91·2 per cent., were found infected. Of 59 pupils from the Girls' High School 48, or 81·3 per cent., were infected. Fourteen persons from the town, including four Europeans who constantly wear shoes, were examined; the Europeans proved to be free from infection; the remaining 10, or 100 per cent., were infected. During December, 1921, 573 treatments were given, but no figures are as yet available as regards the percentage freed from infection. The number of people reached by means of lectures, talks, and demonstrations may conservatively be estimated at 8000.

6. An investigation among students of the Madras Medical College was carried out with intent (*a*) to show present and future members of the medical profession in the Presidency the prevalence of hookworm infection among high-class individuals living under the best existing hygienic surroundings, and the urgency of the problem; (*b*) to demonstrate the latest methods of examining stools for the presence of hookworm ova; (*c*) to detect all those who were infected and offer them the advantages of treatment; (*d*) to test the relative accuracy of methods of examination. Of a total of 480 students, 298 submitted specimens, and examination showed that the hookworm infection rate among the better classes as represented by the students of the Medical College, was 87 per cent. for the Presidency and 55·5 per cent. for Madras city. In many cases the rate of infection among students from certain districts was 100 per cent. Microscopic examination for ova other than those of hookworm, whilst not exhaustive, revealed the fact that *Oxyuris vermicularis* is nearly as universal as the hookworm itself. The ova of *Ascaris lumbricoides* were also found present in nearly 50 per cent. of all cases.

These figures were before the Madras Legislative Council when the grant for hookworm investigation was under discussion, and one member probably under-estimated the possible rate of infection when he suggested that it was probable 50 per cent. of the members of the House themselves were infected with this parasite. A great debt of gratitude is due to the Rockefeller Foundation for the help it has given, and is giving, in the campaign against hookworm in the Madras Presidency.

March 5th.

MENTAL HYGIENE CONGRESS IN PARIS.—From June 1st to 4th a Congress will be held in Paris, organised by the "Ligue Française d'Hygiène Mentale," and under the patronage of the President of the French Republic. The principal subjects of discussion will be as follows: General principles of treatment of the psychopath (introduced by Dr. Antheaume); occupational selection in relation with mental hygiene (introduced by M. Lahy); educational methods and applied psychology (introduced by Prof. Claparède); an international understanding for the furtherance of scientific research into mental hygiene (introduced by Prof. Rabaud); and mental hygiene in the family (introduced by Dr. Toulouse). The general secretary of the Congress is Dr. Genil-Perrin, 99, Avenue de la Bourdonnais, Paris, VII^{e}.

The Services.

EXAMINATION OF R.A.M.C. OFFICERS FOR PROMOTION.

THE campaigns covered by the "Official History of the War, Medical Services, General History, Volume I.," have been selected for the paper to be set at the October examination of majors of the Royal Army Medical Corps for promotion to the rank of lieut.-colonel. This is in addition to questions on the Campaign of the British Army in France and Belgium, 1914, from the outbreak of hostilities to the events covered by Field-Marshal French's Despatch of Nov. 20th, 1914.

ROYAL NAVAL MEDICAL SERVICE.

Surg. Capt. E. A. Penfold is placed on retired list.
Surg. Lieut.-Comdr. A. E. Malone to *Blenheim*, temp.

ROYAL ARMY MEDICAL CORPS.

Maj. W. R. O'Farrell relinquishes the temp. rank of Lt.-Col.
Temp. Capts. relinquishing their commns.: J. R. P. Allin and A. G. Southcombe (granted the rank of Major); G. Elsworth, J. B. Woodrow, W. Groome, J. E. O'Loghlan, C. W. Bennett, R. H. Wace, M. O'Brien, C. P. Ruel, L. Gibbons, and G. Ellis (retain the rank of Captain).

The undermentioned Cols., late R.A.M.C., to be Maj.-Gens.: (Temp. Maj.-Gen.) Sir G. B. Stanistreet, vice Maj.-Gen. Sir M. P. C. Holt (placed on half pay); E. M. Pilcher, and to be supern., vice Maj.-Gen. Sir G. B. Stanistreet; H. A. Hinge, vice Maj.-Gen. E. M. Pilcher.

Surg. Capt. G. B. H. Jones, Royal Horse Guards, retires, receiving a gratuity.

ARMY RESERVE OF OFFICERS.

Lt.-Col. J. Hennessy, having attained the age limit of liability to recall, ceases to belong to the Res. of Off.

MILITIA.

Capt. W. M. Biden to be Maj.

TERRITORIAL ARMY.

Capt. P. D. Warburton, Res. of Off., to be Maj.
Lt. R. W. Mayston (late R.A.M.C., T.F.) to be Capt.
Maj. J. A. Clarke, having attained the age limit, is retired and retains the rank of Maj. with permission to wear the prescribed uniform.
Maj. T. J. Faulder, having attained the age limit, is retired and retains the rank of Maj.
The undermentioned relinquish their commns. and retain their rank, except where otherwise stated: Lt.-Col. T. Fraser (granted the rank of Col.); Capts. T. C. Britton (granted the rank of Maj.), J. R. Chalmers, H. G. Donald, W. T. Henderson, H. S. Hollis (granted the rank of Maj.), A. B. Jamieson, D. Lyon, A. J. McIvor, J. Moir, J. A. Morris (granted the rank of Maj.), R. E. Pitts, H. A. Playfair-Robertson (granted the rank of Maj.), A. G. Reid, E. J. Staddon, J. Strathearn (granted the rank of Lt.-Col.), A. W. B. Loudon (granted the rank of Lt.-Col.).

TERRITORIAL DECORATION.

The King has conferred the Territorial Decoration upon the undermentioned officers: Cols. W. Coates (Hon. Col., E. Lancs. Div.) and E. A. Wraith (A.D.M.S., N. Mid. Div.); Lt.-Cols. C. I. Ellis (D.A.D.M.S., 43rd (Wessex) Div.) and P. G. Williamson (attd. 5th Bn., W. York. R. (retd.)); Majs. A. MacGillivray (retd.) and T. H. Richmond (attd. N. Mid. Bde., R.F.A.); Qr.-Mr. and Capt. A. B. Mount (1st Lond. Fd. Amb.).
Sanitary Cos.: Capt. J. Grounds, 1st London Sanitary Co.

TERRITORIAL ARMY RESERVE.

Capt. M. Coplans, from Genl. List, to be Maj.
Capt. J. P. Kinlock, from Genl. List, to be Capt.

ROYAL AIR FORCE.

Flight Lt. C. W. T. Baldwin relinquishes his temporary commission on ceasing to be employed, and is permitted to retain the rank of Capt.

INDIAN MEDICAL SERVICE.

Majs. F. A. F. Barnardo (Bt. Lt.-Col.), J. McPherson, G. D. Franklin, C. A. Gourlay, W. C. Ross, R. A. Lloyd (Bt. Lt.-Col.), J. C. G. Kunhardt, E. A. Walker, L. Cook, L. B. Scott, G. I. Davys, A. J. V. Betts, F. E. Wilson, Behramji Barjorji Paymaster, N. W. Mackworth (Bt. Lt.-Col.), H. Ross, J. Forrest, L. Hirsch, E. C. C. Maunsell, J. W. Illius, J. P. Cameron, A. W. Greig, and T. W. Harley to be Lt.-Cols.
Capts. Framroze Jamsetjee Kolapore, E. G. Kennedy, A. L. Sheppard, J. A. A. Kernahan (Bt. Maj.), M. L. C. Irvine, J. V. Macdonald (Bt. Maj.), G. L. Duncan (acting Lt.-Col.), Anath Nath Palit, H. A. H. Robson, and C. G. Howlett to be Majs.
Temp. Lts. Cochandy Oommen, and Satis Chandra Sen to be temp. Capts.
The King has approved the retirement of Lt.-Cols. C. H. Watson and E. V. Hugo.
Maung Ba Ket (retd.) is granted the rank of Lt.-Col.

THE WOOD-HILL FUND.

WE have received from Sir HAMILTON BALLANCE, treasurer of the fund for reimbursing Dr. H. Wood-Hill in the heavy expenses incurred by him in the case Clayden *v.* Wood-Hill, the following eighth list of subscriptions. The amount previously acknowledged is £1239 17*s.* 10*d.*

	£	s.	d.
Members of Blackburn and District Medical Society (per Dr. Jeffrey Ramsay, Hon. Treas.); Hertfordshire Local Medical and Panel Committees (per Dr. James J. Smith, Hon. Sec.) .. .. each	21	0	0
Members of North Glamorgan and Brecknock Division of British Medical Association (per Dr. Arthur T. Jones, Hon. Sec.): Dr. Alfred Jones, £2 2*s.*; Drs. Ll. Jones, C. Biddle, E. L. Ward, H. R. Helsby, L. Roberts, E. J. Griffiths, A. T. Jones, Howel Pierce, each £1 1*s.*; Dr. Jayne, £1; Drs. W. E. Thomas, B. M. Lewis, L. J. Roberts, Abel Evans, R. H. Moffit, Foster James, G. M. Dawkin, R. Ryce, each 10*s.* 6*d.*; Dr. R. F. Thomas, 10*s.*; Dr. Binks, 5*s.*..	16	9	0
First instalment from Members of Rochdale Division of B.M.A. (per Dr. James Melvin, Hon. Sec.): Drs. W. H. Bateman, L. Kilroe, S. Wilson, F. W. Mackichan, J. C. Jefferson, A. Dickson, H. Harris, H. G. Ramsbottom, James Melvin, W. H. Carse, W. S. Joss (Rochdale), each £1 1*s.*; Drs. George Geddes, H. H. J. Hitchon (Heywood), and Dr. James Melvin (Bamford), each £1 1*s.*	14	14	0
Members of Northampton Division of B.M.A. (per Dr. W. M. Robson, Hon. Sec.): Drs. W. E. Audland, A. W. Cooke, J. More, W. M. Robson, W. Ross, E. A. Sanders, D. Stone, P. S. White, R. Winterbotham, each £1 1*s.*; Dr. F. Grindon, £1; Dr. D. F. Bull, 10*s.* 6*d.*; Dr. A. Glen Hayes, 10*s.*..	11	9	6
Medical Board of Liverpool Royal Infirmary (per Dr. John Hay, Hon. Sec.); Prof. David Drummond, C.B.E., President of B.M.A. (per Dr. Alfred Cox); Medical Committee of Royal Free Hospital (per Mr. Cecil A. Joll, Hon. Sec.); Members of Bournemouth Medical Society (per Lieut.-Colonel A. Heygate Vernon, R.A.M.C., Hon. Treas.) .. .. each	10	10	0
Members of S.E. Counties of Scotland Division, B.M.A. (per Dr. M. J. Oliver, Hon. Sec.): Dr. Tyrrell (Galashiels), £1 1*s.*; Dr. MacRobert (Innerleithen), £1; Drs. Dixon, S. G. Davidson, Mallace, Turnbull, Barrie, Ross Haddon (Hawick), Dr. Somerville (Galashiels), Dr. Evans (Newcastleton), Dr. Herriott, and Dr. Oliver (St. Boswells), each 10*s.* 6*d.*; Dr. Fleming and Dr. S. Davidson (Kelso), each 10*s.*; Dr. P. Henderson (Galashiels), Dr. Rotherford (Fairnington), each 7*s.* 6*d.*; Dr. McMillan (Melrose), 2*s.* 6*d.*; less commission on cheques, 1*s.*	9	2	6
Practitioners in Isle of Ely (per Mr. A. C. S. Waters, Hon. Sec., Isle of Ely Division of B.M.A.): Dr. J. G. Slade, £2 2*s.*; Dr. F. H. Beckett, 10*s.*; Drs. C. E. Stephens, P. H. Henley, G. H. Lucas, W. Meikle, T. E. Price, C. C. Ling, C. H. Harding, J. W. A. Wilson, A. Pain, A. C. S. Waters, A. S. Robertson, G. B. Davis, F. E. W. Rogers, H. R. Reynolds, J. W. Hay, E. A. Bullmore, R. Butterworth, A. E. P. Parker, W. H. Hardy, D. H. Scott, W. Groom, C. W. Howe, H. C. Meacock, J. G. Burgess, J. J. Waddelow, each 5*s.*..	8	17	0
Members of Guildford Division of B.M.A. (per Mr. H. P. Gabb, Hon. Sec.): Drs. Mitchell and O'Connor, each £1 1*s.*; Drs. Cliff Hodges, Lyndon, Sheaf, and Sloman, each £1; Drs. Jobson, Parker, and Weaver, each 10*s.* 6*d.*; Drs. Gabb and Pearse, each 10*s.*	8	13	6
Members of Chichester and Worthing Division of B.M.A. (per Dr. H. J. M. Milbank-Smith, Hon. Sec.)	5	15	6
Hon. Medical Staff of Ancoats Hospital, Manchester (per Dr. A. H. Holmes, Hon. Treas.)	5	5	0
Sir Rickman J. Godlee, Bart, K.C.V.O. (Whitchurch, Oxon.)	5	0	0
Dr. J. H. Busteed (Bungay); Mr. S. C. Homesfield (Stowmarket); Dr. M. H. Hannigan (Botesdale); Dr. Charles R. Smith (Beccles); Dr. J. T. C. Laing (London) .. .. each	2	2	0
Dr. Mildred Clark (Queensland)	2	0	0
Dr. W. J. Pickup (Coventry); Captain D. W. Pailthorpe, R.A.M.C. (Khartoum); Dr. John B. Lowe (Wecke); Dr. Cecil H. W. Page (North Walsham); Dr. T. Wood Locket (Bratton), each	1	1	0
"S. A." (Cambridge)	1	0	0
Dr. John W. Sandoe (Broad Clyst)	0	10	0

Correspondence.

"Audi alteram partem."

A TONSIL AND ADENOID INQUIRY.

To the Editor of THE LANCET.

SIR,—I think Dr. S. Barwise's idea of an inquiry into the causation of adenoids and tonsils, published in your issue of April 1st, is a very excellent one. I would suggest that the infant welfare centres should take a leading part in this work. The early months of life I feel sure will be the most important in an investigation of this kind; but I am not at all convinced that Dr. Barwise's 50 health visitors would be the ideal persons to carry out this work in its entirety; they could, no doubt, supply data concerning the housing conditions, but their views as to methods of feeding would not be of very much value. I think the doctors conducting the welfare centres are the proper authorities to investigate the feeding problem, in fact most of the inquiry form must be filled in by the doctors themselves if the statistics are to have any value. With regard to the form itself, this would require drastic alterations in several respects, and I would suggest that the proper authority to draw up an inquiry form would be the Section for the Study of Disease in Children of the Royal Society of Medicine. I feel sure that the profession would feel more enthusiastic about the forms if they knew that the subject had been carefully considered by acknowledged clinical experts.

There is one point in Dr. H. Merrall's letter, which appears in the same issue, with which I heartily agree—viz., that enucleation of the tonsils is an unnecessary operation. If we believe, and I imagine we all do, that the main functions of tonsils and adenoids are those of defence, it is surely unscientific to remove them completely. The tedious convalescence which so often occurs after enucleation is a great disadvantage, and I believe this is the chief reason for the public alarm which has lately become so prominent in the press. Removal of the superficial portion of the tonsil has little or no constitutional after-effects. I am quite certain that a large number of slightly hypertrophied adenoids can be kept within bounds if the thick mucus which lies in the post-nasal space is removed by syringing the nose with saline solution twice a day. This simple treatment has been most successful at my welfare centres, and I am positive that many cases would, in former years, have been operated upon on the supposition that adenoids were causing the obstruction, whereas as a matter of fact the thick mucus was the real cause.

I am, Sir, yours faithfully,

Kensington, April 18th, 1922. RONALD CARTER.

THE PERNICIOUS VOMITING OF PREGNANCY.

To the Editor of THE LANCET.

SIR,—It can no longer be maintained that the gentle art of delivering women of children successfully is a necessary condition for the understanding of metabolic processes occurring during pregnancy. But up till now, physicians, for the most part, have left these matters alone—in spite of the fact that certain disturbances of metabolism, thought to be peculiar to pregnancy, occur also in the non-pregnant. Surely, the study of these aberrations in the non-pregnant must throw light on their cause in pregnancy. If, for instance, acute yellow atrophy is due to a toxin, since this disease occurs in the non-pregnant, it is plain that when it occurs in pregnancy it cannot be due to some specific toxin the result of the pregnancy; it must be due to some other toxin which occasionally arises when the uterus is empty. Physicians, I submit, should grapple with such problems, and come to the aid of obstetricians and help them to understand the toxæmias of pregnancy. Dr. A. F. Hurst, in so far from trespassing on "obstetrical preserves," is to be congratulated on his paper on the Pernicious Vomiting of Pregnancy. It is not without consequence: it has brought to light certain discordant opinions which might otherwise have remained hidden; and I think will bring further confusion to those who believe in the toxæmic origin of the toxæmias of pregnancy.

Your issue of April 8th produced two letters displaying two opposing and contradictory views on the pernicious vomiting of pregnancy. The one view is that not all the types of pernicious vomiting are neurotic (or hysterical)—some are truly "toxæmic" in origin (Eden): the other that all are neurotic—none are toxæmic in origin (Oldfield). Thus, whilst Mr. Eden believes that some cases of pernicious vomiting are caused by a specific toxin (presumably arising from the developing ovum), Dr. Oldfield rejects such a hypothetical cause. I believe Dr. Oldfield is right.

In your issue of April 15th Mr. Fairbairn endeavours to throw oil on the troubled waters. He does not refer to the fundamental position taken up by Dr. Oldfield, but thinks the controversy between Mr. Eden and Dr. Hurst is due to a "misunderstanding of terms." He thinks "pernicious vomiting" should simply connote the condition of persisting vomiting insensibly arising from the morning sickness of pregnancy; and that the term "toxæmic vomiting" should be restricted to those cases in which vomiting arises later in pregnancy, and is but one amongst other toxæmic manifestations (albuminuria, œdema, headache, blindness). This being so, he agrees with Dr. Hurst that the pernicious vomiting of pregnancy is a neurosis. For more than ten years at St. Thomas's Hospital the uterus has not been emptied for pernicious vomiting; only occasionally has this been done in toxæmic cases, and only in such, not because of the vomiting, but because of the results of biochemical investigations as to the renal and hepatic functions. Thus, the suggestion is that in neurotic cases of the pernicious vomiting the liver and kidneys do not come to suffer; whereas in the toxæmic cases these viscera necessarily become diseased, and only can the morbid process be checked by emptying the uterus. But Mr. Fairbairn is incomplete in his argument. He does not show that the neurotic cases always get well and never insensibly pass into the "toxæmic" variety—which seems to me the point of Dr. Hurst's paper. On the contrary, he distinctly says. "At home a cure is almost hopeless." What, then, happens to such patients kept at home? Do they die? And in the further and ultimate course of the disease, do they present no sign or symptom suggestive of a "toxæmic origin"? Are the biochemical investigations negative? the kidneys and liver normal, with no post-mortem lesions? Dr. Hurst (April 15th) gives the answer clearly. We do not wait, he says, for conclusive evidence which—according to Mr. Eden—the post-mortem would give of the toxæmic nature of the case: we prefer to cure the patient by psychotherapy.

We cannot believe that because a patient gets well no lesion existed during the disease. In Dr. Hurst's case, the urine contained no albumin or sugar, but the ammonia-coefficient on the day of admission was 28. Does this mean there were no liver lesions? In the case reported by Prof. Winifred Cullis and Dr. Evelyn Hewer (April 1st) the ammonia-coefficient was 58, the patient recovered without emptying the uterus and subsequently a full-term healthy child was born. Was the liver in this case, throughout the pregnancy, normal? And in the cases successfully treated by physicians and others—to which Dr. Hurst in his paper refers—cases which would previously have been regarded as incurable except by emptying the uterus—in none of these cases were there liver lesions? Why, Prof. V. J. Harding, as THE LANCET in a leading article last week points out, believes that a simple starvation produces a fatty infiltration of the liver; and this for him is the first step in the hepatic devolution in pregnancy caused by persistent vomiting!

And if cases of hysterical vomiting in pregnancy get well when treated in hospital, but die when treated at home, we must assume that the cessation of the vomit-

ing in the one case is the cause of the cure; and that its continuance is the cause of the progress of the disease in the other—and of the lesions! Since, on the one hand, these lesions are the same as are found in acute yellow atrophy (in the non-pregnant); and on the other, the same as in the so-called "toxæmic cases" of pernicious vomiting, the conclusion is clear. It is that there is no pernicious vomiting of toxæmic origin in pregnancy, unless it be that comparable with the vomiting in uræmia: a vomiting which occurs as a rule late in pregnancy, when a diseased process is already in being, such as in the pre-eclamptic state or in acute yellow atrophy. As in uræmia, so here, the source of the poison is extra-uterine. In the early stages of all these conditions, either there is no toxin at work, or if there is (as? in acute yellow atrophy) it is not specific of pregnancy. The early stages of all can be explained without falling back on a supposititious toxin, specific in nature.

What is so strange is that the lesions of the liver found after death in cases of pernicious vomiting should be regarded as evidence of such a toxin. But those who think in this way, and all those wonderful people who regard pregnancy as pathological, instead of physiological—the most natural, the most common, the most desired of all affairs—have missed a somewhat important point. They have missed the significance of the site in the hepatic lobules of the affected cells. In this disease, it is the centrally placed cells which are affected—which first degenerate and then necrose. Whitridge Williams—whom the Ten Teachers have followed so closely—indeed states the degeneration in some cases is uniform; but the other condition usually is so pronounced that he with others regards it as the conspicuous feature of the pathological change. What, then, is the significance of this? Are we to believe that the centrally placed cells, those around the hepatic venule, are especially prone to the toxin, that the specific toxin selects these? Are not all the cells in any one hepatic lobule, from the biochemical, the metabolic point of view, the same? The only difference in the cells in any one hepatic lobule is a physical difference, a difference in position in relation to the periportal spaces on the one hand, and to the centrally placed hepatic venule on the other; not a difference in chemical or biochemical reaction. The lesion in pernicious vomiting is specific, not in respect to the character of the cell, but in respect to the position of the cell. This, I think, puts a toxin—whether coming from placenta or corpus luteum—out of court. On the other hand, a general compression of the liver, a result of the raised intra-abdominal pressure in pregnancy, if great enough, though facilitating degenerative changes in the organ, would not explain the site of the lesions. But this does not show that the physics of the abdomen play no part. Just as in the pre-eclamptic state (in which the periportal cells are most affected), besides the raised intra-abdominal pressure, there is the activity of the woman to consider; so here, another factor is in play. In the pernicious vomiting of pregnancy, the position of the cells affected is such that they are in closest touch with the radicles of the hepatic vein, and feel first and most the effect of sudden rises of blood pressure occurring in that vein. What, then, happens during the vomiting of pregnancy? Simply ejection of food? —always without effort? And during the retching—repeated time and again—even during the night disturbing the patient's sleep? Nothing of import? And the diaphragm: What is it doing? Not compressing the liver? not subjecting it to successive severe impactions? Do not the veins of the forehead sometimes swell and conjunctival hæmorrhages occasionally occur: and for the liver, it means . . . . nothing . . . .? . . . .! The brown vomit, then, and the epigastric pain—what do these mean? Who has not seen the altered blood ejected and wondered where it came from and how and why? . . . . and what was happening to the blood flow *through* the liver during such times?

Such questions, it seems to me, require answering before it is stated with such certainty, as is constantly being done, that the toxæmic origin of the toxæmias of pregnancy is established; or before investigators advance from such a base in search of the origin of eclampsia. For me, at least, the idea of a specific toxæmia in pregnancy is spent, it is untenable even in respect of the pre-eclamptic state, it is more—it is unreasonable. That it is untenable from the point of view of the pernicious vomiting of pregnancy, I submit, is shown.—I am, Sir, yours faithfully,

R. H. PARAMORE, F.R.C.S. Eng.

Brook-street, Grosvenor-square, W., April 22nd, 1922.

To the Editor of THE LANCET.

SIR,—In his letter in your issue of April 15th Dr. A. F. Hurst has again been led astray by his liking for old editions. In the last edition of my text-book (1919) the statement about the urine in hysterical vomiting is that it "remains normal except that the ammonia coefficient may be abnormally high" (p. 122). The purpose of my previous letter was to point out that Dr. Hurst had misrepresented obstetric teaching, especially in regard to his statement that obstetricians commonly adopted the practice of emptying the uterus in cases of hyperemesis when the ammonia coefficient was increased to 10 per cent. To this simple issue his letter of April 10th is almost entirely irrelevant. I did not complain of "trespass" as he suggests, but of misrepresentation, and I cannot find in his letter any justification of his original statements, or alternatively any expression of regret for having made them.

I am, Sir, yours faithfully,

T. WATTS EDEN.

Queen Anne-street, W., April 18th, 1922.

MALARIA AND THE MOSQUITO.

To the Editor of THE LANCET.

SIR,—My attention has been drawn to the obituary notice of Sir Patrick Manson, published in THE LANCET of April 15th, in which you state that "he was the first to trace the connexion between the mosquito and the malaria parasite." Will you allow me space to say that I for one cannot admit the truth of this statement in whatever sense it may be read? The detailed history of the subject, with full references to the literature, will be found in my "Researches on Malaria" (*Journal of the Royal Army Medical Corps*, April, May, June, 1905), and in my "Prevention of Malaria" (Murray, 1910, 1911); and the final verdict was pronounced long ago by Manson himself (*The Lancet*, August 20th, 1898, p. 488, and *Brit. Med. Jour.*, Sept. 24th, 1898, p. 849), by Laveran in his report to the Académie de Médecine (Bull. Séance du 31 Janvier, 1899), by Robert Koch (Zeitschr. für Hygiene, Bd. xxxii., 1899), by G. H. F. Nuttall (*Quart. Jour. Microscop. Science*, vol. xliv., No. 175, p. 429, May, 1901), and by Lord Lister in his address to the Royal Society (*Brit. Med. Jour.*, Dec. 8th, 1900, p. 1625), and in his remarks to the British Association (*Times*, Sept. 19th, 1901). If such authorities as these do not suffice to establish any case as a *chose jugée*, I do not know what can ever do so.

I am, Sir, yours faithfully,

London, April 21st, 1922. RONALD ROSS.

*** The sentence has not the same signification for us. Others had suggested the medium of blood-sucking insects, and Sir Patrick Manson is known not to have completed the work. His own words, published in the *British Medical Journal* of Sept. 24th, 1898—one of the articles referred to by Sir Ronald Ross—are as follows:—

"I concluded, then, that the mosquito was the liberating agent of the malaria parasite as well as the filaria, and that the flagellated body sucked, in its latent form, so to speak, into the mosquito stomach developed therein; that the flagella broke free from the central sphere, as we know they do on ordinary blood slides, and that in virtue of their locomotive faculty they traversed the blood in the mosquito's stomach, penetrated the wall of the mosquito's stomach, entered some cell and there started the extra-corporeal life of the malarial parasite. Originally this was theory pure and

simple—theory, however, that was justified, I think, by many facts as well as by analogy; theory which has now been thoroughly borne out by subsequently and carefully observed facts.

"I was unable myself, from various circumstances, to undertake observations in foreign countries with the idea of establishing the truth of this theory; but fortunately my friend Surgeon-Major Ronald Ross, I.M.S., who had already done much work in blood pathology, was so struck with the probabilities of the hypothesis I had expressed, that he undertook to work out the subject on his return to India, now some three years ago.

"The first part of the theory he very quickly proved."

That is the "tracing of the connexion" we implied. —ED. L.

THE PATHOLOGICAL SECTION OF THE ROYAL SOCIETY OF MEDICINE.

To the Editor of THE LANCET.

SIR,—At the annual meeting of the Pathological Section of the Royal Society of Medicine a discussion took place with reference to the publication in the medical journals of reports of papers and of the discussions arising out of them.

It was decided to continue the present policy of the Section, which holds that it is undesirable that any reports should be published, except such abstracts as the authors of any papers may hand to the secretary, with the request that he shall forward them to a particular journal. It was also decided to continue the present rule that no report of any discussion be published.

Under the resolutions passed, the secretary wil in future, at the request of any author, forward an abstract provided by the latter to any particular medical journal for editorial consideration with a view to publication.

I have been instructed by the Section to bring these resolutions to your notice.

I am, Sir, yours faithfully,
W. W. C. TOPLEY, Hon. Sec.

Institute of Pathology, Charing Cross Hospital Medical School, London, W.C. 2,
April 20th, 1922.

ALKALIPENIA.

To the Editor of THE LANCET.

SIR,—In the third paragraph of my letter the sentence should read: "(2) depletion of alkali reserve through over-stimulation of the respiratory centre, consequent washing out of CO_2 from the blood and compensatory excretion of alkali by the urine." In the same paragraph "compensatory acidosis" should read "compensated acidosis."

I am, Sir, yours faithfully,
L. CUNNINGHAM.

Biochemical Laboratory, Liverpool University,
April 22nd, 1922.

A DISCLAIMER.

To the Editor of THE LANCET.

SIR,—The recent correspondence in the *Times* concerning the fees of practising consultants has brought a considerable addition to my morning mail, under the impression that I am the medical correspondent of that paper. This must be as embarrassing for that gentleman as for me.

I am, Sir, yours faithfully,
Harley-street, W., April 22nd, 1922. C. M. WILSON.

Corrigendum.—The head of the chemical department of the laboratory of the Royal College of Physicians in Edinburgh, mentioned last week in Dr. Chalmers Watson's letter, is Mr. Kirmack.

PRESENTATION TO A MEDICAL MAN. — The inhabitants of the town and neighbourhood of Lucan, in the county Dublin, recently presented Dr. D. Hampson, medical officer of the district, with an address, a motor car, and a cheque for 100 guineas. Dr. Hampson has been working in Lucan for the past 16 years, and his services have been much valued.

Obituary.

SIR ALFRED PEARCE GOULD, K.C.V.O., C.B.E., M.S. LOND., F.R.C.S. ENG.,

CONSULTING SURGEON TO THE MIDDLESEX HOSPITAL.

WE recorded last week the sad news that Sir Alfred Pearce Gould had died suddenly on Wednesday, April 19th, at his country house at Ashburton, information which will have been received by the whole medical world not only with deep regret but with a sense of shock. For, although he had retired from active practice, this was such a recent event, and he was so young for his years, that the many charitable and scientific movements with which he was associated could count upon his advice and support for a long time to come.

Alfred Pearce Gould was born at Norwich on Jan. 2nd, 1852, the son of a Nonconformist clergyman. He was educated at Amersham Hall School and University College, London, whence he entered the medical school of University College Hospital in 1868. At the hospital he speedily made his mark, and having taken the degree of Master of Surgery in the University of London in 1876, and obtained the diploma of Fellow of the Royal College of Surgeons of England in the following year, he began his long career as a hospital surgeon by appointment to the Westminster Hospital as assistant surgeon and lecturer on anatomy. His connexion with the Westminster Hospital, however, was brief, for he was elected assistant surgeon to the Middlesex Hospital five years later, with which institution his name was henceforth to be associated for 40 years.

As hospital surgeon Gould was a fine example of practitioner and teacher, and his austerity of manner did not blind the students to the fact that they had in him a potential friend as well as an accurate and informing master. Although, and especially towards the middle and later periods of his career, he was known most prominently as an operating surgeon in association with malignant disease in its various manifestations, Gould was essentially a general surgeon, bringing a wide range of experience and learning, aided by complete familiarity with anatomy, to bear on all the problems of operative surgery. This can be well seen in his Bradshaw lecture on cancer, delivered at the Royal College of Surgeons of England in 1910. This address was a wonderful résumé of the theories, tenable and otherwise, in regard to the incidence of cancer and its pathology, especially in reference to the development of cancer research. Gould ended with some remarkable examples of cure following operation, and it is noticeable that the operations were undertaken for such varying conditions as cancer of the breast, rectum, uterus, jaw, femur, and other regions. His written and spoken words show a similar range of experience. "The Evolution of Surgery" is an accurate description of the development of the science as a whole, while the "Elements of Surgical Diagnosis," the last of whose many editions appeared only some two years ago, is exactly the kind of manual to focus the attention of those with less opportunity for experience upon the essential points for discrimination. He was the author, also, of the articles on injuries and diseases of the blood-vessels and on the general surgery of the chest, in Treves's "System of Surgery," and in these he displayed wide anatomical and clinical knowledge and at the same time showed why for him the discovery of Rontgen had such immediate interest, alike as an aid to diagnosis and as a possible curative influence. The X rays appealed to him from the first as an enormous aid to surgery, and in an address on radium and cancer delivered in 1913 at the annual meeting of the West Somerset Branch of the British Medical Association, he gave some remarkable examples of the curative and prophylactic use of radium in malignant disease.[1]

[1] Brit. Med. Jour., Jan. 3rd, 1914, p. 6.

Sir Alfred Pearce Gould was a prominent figure in connexion both with his University and College. At the University of London he served as Dean of the Medical Faculty and Vice-Chancellor, besides being a Fellow of University College. At the Royal College of Surgeons of England he was on the general Court of Examiners for several years, as well as on the Board of Examiners in Dental Surgery. He was elected to the Council in 1900, and served for 16 years, being vice-president at the time of his retirement. In all scientific professional movements he was equally a leader. A past president of the Medical Society of London, he was at different times treasurer of the Royal Society of Medicine and president of the Clinical Section, while his immediate interest in the possibilities of radiology as an aid to operative surgery was indicated by his becoming president of the Rontgen Society. He was created K.C.V.O. in 1911. During the war he acted as officer in charge of the surgical division of the 3rd London General Hospital at Wandsworth with the rank of Lieutenant-Colonel R.A.M.C. (T.F.); for these services he was created C.B.E. in 1919.

Sir Alfred Pearce Gould was a man of very decided character, and in many quarters was thought to be intolerant on this ground. He was, for example, an uncompromising advocate of the temperance cause, President of the Society for the Study of Inebriety, and a regular student of all the evidence of the relations between inebriety and disease. But he was no visionary here: while it was part of his creed and his temperament to lay great stress on the evils of alcoholism, he was not blind to the fact that the curse of alcohol abides more in its removal of the powers of criticism and restraint than in its actual influence as a poison. He was a consistent supporter of all organised medical charity, a generous donor and active worker in connexion with Epsom College and the Royal Medical Benevolent Fund. For very many years he was associated with the work of the Society for the Relief of Widows and Orphans of Medical Men, and he presided at one of its meetings but a few days before his death. Those who had reason to regard him as hard in some of his judgments would have gained a very different impression on learning his attitude towards real cases of hardship deserved or undeserved. Gould's religion was a thing of daily life and found one of its expressions in his attitude to the work of medical missions. A few lines from a recent letter to our own columns may serve to show a breadth of outlook not always associated with zeal:—

> I wonder whether the young men and women now equipping themselves for their life's work in our medical schools are adequately alive to the many and varied openings for them in China! It is notorious that with most of us life's motives are complex. Associated with a certain interest in the practice of medicine and a wish to relieve the sufferings of those around us, there are a number of other considerations that influence men and women in prosecuting medical study and practice. These may be as humble as adopting a means of livelihood that lies closest to hand, and the desire to follow in a father's footsteps, or as exalted as the determination to enlarge the field of knowledge, to discover new and better means of relief of human suffering, or, better still, to inaugurate measures to prevent pestilence and disease and remove restraints upon the full development of human powers. Between these extremes are many others that will occur at once to your readers. I would only refer to love of adventure and desire to propagate Christianity.

Sir Alfred Pearce Gould was twice married, first to a daughter of Mr. John Heelas, of Wokingham, and secondly to a daughter of the late Lord Justice Lush. Two of his sons adopted the medical profession, of whom one, Surgeon A. L. Pearce Gould, R.N., formerly operating surgeon at the R.N. Hospital, Plymouth, was killed in action in 1918.

HENRY WYNYARD KAYE, M.D. OXF.,

DIRECTOR OF MEDICAL SERVICES, MINISTRY OF PENSIONS.

THE untimely death of Dr. H. W. Kaye at his home at Hatfield Peverel on Friday, April 21st, is a loss, not only to a wide circle of friends outside his family, but to the medical department of the Ministry of Pensions and to the country. By his death the war-disabled, though all unknown to them, lose a friend and helper. All of his talents, and they were many and varied—a clear intelligence and breadth of view, a rare tenacity of purpose, a manifest sincerity, and even a physique hardened by the field sports he loved—were devoted to the public service.

In the Ministry of National Service, and still more in the Ministry of Pensions, where, as a director of medical services, he was in charge of the department providing treatment to war-disabled officers and men, he found congenial spheres for the employment of his great abilities and experience, and for the expression of the fundamental motive of his life—the betterment of the health of his fellow beings. "If ever a man consecrated and shaped his life to this noble end and died in doing so," writes one of his colleagues, "it was Kaye."

Born in 1875 in London, the son of Joseph Kaye, educated at Winchester, Oxford, and the London Hospital, Kaye passed several years in practice at Rome, San Remo, and Strathpeffer, and was so employed when war broke out. He served in France continuously from 1914 to 1918, when he joined the headquarters staff of the Ministry of National Service under Sir James Galloway, chief commissioner of medical services, to whom he was attached as personal assistant. When the recruiting activities of that Ministry ceased and its medical organisation became amalgamated with the medical department of the Ministry of Pensions early in 1919, Kaye became a director of medical services under Sir Lisle Webb. At that time he was engaged in completing the "Report on the Physical Examination of Men of Military Age by National Service Medical Boards," which was largely his own work, and had charge of the department of medical statistics and general medical information. He was then placed in charge of the whole provision of treatment by the Ministry, continuing, however, the collation of medical statistics until this work passed to the statistical department of the Ministry.

Dr. Kaye's life was one of incessant activity. In addition to his official duties he acted as secretary of a medical disability committee, composed of members of the Royal Colleges and ministerial officials, and advising the Minister of Pensions on medical questions affecting his department. He was also a member of the Comité Permanent Interallié and sat on the editorial committee of the *Revue interalliée pour l'étude des questions intéressant les mutilés de la guerre*. Last year he attended the general congress of this committee at Rome as the principal delegate of the Ministry and received from the King of Italy the Commandership of the Order of the Crown of Italy. To these and to other committees on which he sat, such as the War Office Shell-Shock Committee, he brought a critical and constructive mind, a ready wit, and a friendly presence and courtesy which never varied.

The end came quickly. Stricken down by pneumonia whilst addressing a meeting of his medical colleagues at Leeds, he fell, as he would have wished, at the post of duty.

PRESENTATION TO MR. J. S. MCARDLE.—A large assembly of his friends, medical and lay, entertained Mr. J. S. McArdle to dinner last week in the Dolphin Hotel, Dublin, Dr. M. F. Cox being in the chair. Mr. McArdle has been professor of surgery successively at the Cecilia-street School of Medicine and at University College for many years, and is senior surgeon to St. Vincent's Hospital. After dinner a series of presentations was made to him consisting of (1) his portrait, painted by one of his pupils, Dr. Boyd Barrett; (2) a sum of money to found a perpetual surgical prize of £20 to be won each year in St. Vincent's Hospital; (3) a sum of money to provide a gold medal in surgery for competition among the students of University College. A motor-car was presented to Mrs. McArdle. The dinner and presentations are a remarkable expression of the affection in which Mr. McArdle is held by a large circle.

Medical News.

UNIVERSITY OF CAMBRIDGE.—At recent examinations the following candidates were successful:—

DIPLOMA IN PUBLIC HEALTH.

Lancelot W. Barlow, William H. Blackburn, James S. Cook, Philip L. Davies, Charlotte A. Douglas, Janet W. Hepburn, Maurice S. Moore, Georgina Murdoch, *Vishwa Nath, *John H. Reford, Adolphe G. M. Severn, and Elaine B. S. Stocquart.

* Distinguished in the principles of Hygiene.

UNIVERSITY OF GLASGOW.—The following degrees were conferred on April 18th:—

Doctor of Medicine.—John A. Gilfillan.

Bachelors of Medicine and Bachelors of Surgery.—Robert Adam, Walter R. Allan, Martha L. Anderson, William Bain, Alexander Baird, Dugald Baird, Barclay Barrowman, Mary E. Berry, Alexander R. Black, Margaret W. Blackwood, Alexander W. Borland, Jemima G. Brodie, Alexander O. Bruce, Catherine M'Lean Buchanan, James I. Cameron, John A. Cameron, Robert M'Luckie Carmichael (with commendation), Katharine L. Couper, William Davie, Christian D. H. Eason, Isedor Fine, Margaret A. Galbraith, Westall Geyer, William Gibson (with commendation), Gordon S. Gilchrist, Marget L. Gilchrist, Katharine J. Guthrie, John M. Hain, David R. Hamilton, Edward E. Henderson, Catherine Hill, Isobel R. Hill, Matthew Jackson, John E. Jeffrey (with commendation), Hugo Kay, Jean V. Kirkwood, Daniel Lamont, Rhoda M. J. Lochhead, George M'Alpine, Thomas S. MacDonald, William D. Macfarlane, William M'Kendrick, Hugh M'Kerlie, Mary H. Maclachlan, James M'Nair (with commendation), Robert S. V. Marshall, John C. M'Intyre Matheson, Peter Milligan, John T. Moffat (with commendation), Elizabeth M. Nairn, William G. Niblock, George S. P. Noble, Margaret M. Paterson, Joanna T. Rae, William Robinson, James Rowatt, Rosemary E. Scanlan, James Shaw, Isobel M. Smith, James Sneddon, Archibald V. Steen, Alexander Symon, Archibald B. Taylor, Charles N. Temple, Daniel M. Thompson, Eleanor M. Torrance, Alfred A. Van-Lingen, Hector M. Walker (with commendation), John W. Walker, Elizabeth Wheatley, and Andrew Wilson.

The following prizes have been awarded: Arnott Prize of £25 for examination in Physiological Physics, Henry S. Russell; Bellahouston Gold Medals for eminent merit in Thesis for M.D., Douglas K. Adams, Thomas J. Mackie, and Noah Morris; Asher Asher Gold Medal (Laryngology and Rhinology), Robert H. Burnett.

UNIVERSITY OF LONDON.—A course of four lectures on Insects and Disease will be given at University College, Gower-street, W.C., by Sir Arthur Shipley, F.R.S., on May 2nd, 9th, 16th, and 23rd, at 5 P.M. The chair at the first lecture will be taken by Prof. H. R. Kenwood.—A lecture on the Human Neo-cerebellum will be given at the house of the Royal Society of Medicine, 1, Wimpole-street, W., by Prof. C. Winkler, on May 3rd. The chair at this lecture will be taken by Prof. Sir Frederick Mott, F.R.S. Admission to these lectures is free without ticket.

ROYAL COLLEGE OF PHYSICIANS OF LONDON.—Prof. E. Mellanby will deliver the Oliver-Sharpey Lectures on May 2nd and 4th, at 5 P.M., at the College, Pall Mall East, London, W. The subject will be Some Common Defects of Diet and their Pathological Significance.

ROYAL COLLEGE OF SURGEONS OF ENGLAND.—Two Hunterian lectures on the Results and Treatment of Gunshot Wounds of the Blood Vessels will be delivered in the theatre of the College in Lincoln's Inn Fields, by Prof. Harold Burrows, at 5 P.M. on May 10th and 11th.

THE EBBW VALE DISPUTE.—The dispute between the Ebbw Vale Workmen's Medical Society and the doctors in their employ will, unless adjusted, leave one of the thickly populated mining valleys in South Wales without organised medical attendance upon the wives and families of miners at the end of the present month. In this valley panel practitioners have contracted with the Workmen's Society to attend non-panel patients on a capitation basis. Unemployment and reduced wages have adversely affected the finances of the Society during the past two years, so that a reserve fund of £10,000 at the end of 1920 has been turned into a heavy deficit. Directors' fees, clerical cost, and dispensers' wages having been cut down, the medical men were then asked to share in the general reduction of expenses. In February, 1921, the doctors were being paid 22*s.* per family; the Society suggested a return to the pre-war figure of 13*s.* Prolonged negotiations led up to an arbitration, held at Newport on Dec. 21st, 1921, at which the basis was fixed at 18*s.* 4*d.* In spite, however, of this mutually binding agreement, notice was given to the doctors terminating the arrangement, as fixed by arbitration, at three months' notice, which expires on Monday next. The Society reiterate their offer of a family rate of 13*s.*, offering in addition a sliding scale arrangement by which for every 5 per cent. increase in miners' wages the doctors would receive an additional 2½ per cent. increase on their family rate, a like amount being paid into a reserve fund. In resisting this proposal the local practitioners point out that, while perfectly willing to accept an equitable reduction in salary, nevertheless their pooled salaries do not account for a preponderating proportion of the total income of the Society. In 1920, for example, when the total income was £39,660 the doctors in the Ebbw Vale area received £14,048, including amounts received from the Insurance Committee; and during the years 1913 to 1920, when the total income of the Society was £161,000, the doctors received £66,000, leaving a net credit in the hands of the Society of £95,000. The practitioners suggest an alternative scheme on a definite poundage basis, which would, they consider, in the long run be cheaper and likely to achieve a permanent settlement. There the matter rests at the moment.

ROYAL INSTITUTION OF GREAT BRITAIN.—The Friday evening discourse on May 5th will be delivered at 9 P.M. by Dr. Michael Grabham. The subject is Biological Studies in Madeira. On May 2nd, at 3 P.M., Sir Arthur Keith, F.R.S., will give his second lecture on Anthropological Problems of the British Empire (Series II.) entitled Racial Problems of Africa. On May 4th, at 3 P.M., Dr. Edwin H. Barton, F.R.S., will give his second lecture on a Syntonic Hypothesis of Colour Vision.

NATIONAL COUNCIL FOR COMBATING VENEREAL DISEASES.—The annual general meeting of this Council will be held on Monday, June 19th, and not on June 12th as previously announced to members of the Council. At the request of the Corporation of London there will be held in the Council Chamber of the Guildhall on May 3rd, from 10.30 A.M. to 4.30 P.M., a conference at which the Lord Mayor will open a discussion on "How Persons Infected with Venereal Disease can best be Retained under Treatment until a Non-infective Condition has been Attained." It is hoped by this conference of medical specialists and administrative authorities to consider the subject from many points of view in the endeavour to formulate a practical scheme, whereby infective persons shall remain under treatment so long as they are a danger to the community. Lord Gorell will preside. Members of the Council wishing to attend the conference should apply for a ticket to 80, Avenue Chambers, Southampton Row, London, W.C. 1.

FELLOWSHIP OF MEDICINE AND POST-GRADUATE MEDICAL ASSOCIATION.—The first of a series of lectures, free to all medical men, will be given at 1, Wimpole-street, W., on May 1st, at 5 P.M., by Sir Humphry Rolleston, on Recent Physiology of the Liver and its Application in Practice. The syllabus of the special post-graduate course in general medicine, to be held from May 1st to 13th, under the auspices of the Association, has now been issued. The hospitals taking part include Bethlem Royal Hospital, Hospital for Consumption and Diseases of the Chest, Brompton, Hospital for Epilepsy and Paralysis, London Lock Hospital, Middlesex Hospital, National Hospital for Diseases of the Heart, Paddington Green Children's Hospital, Royal Westminster Ophthalmic Hospital, St. George's Hospital, St. Mark's Hospital for Diseases of the Rectum. The fee for the course is five guineas. Further particulars may be obtained from the Secretary at the Fellowship of Medicine, 1, Wimpole-street, London, W. 1.

SOUTH-WEST LONDON POST-GRADUATE ASSOCIATION: AFFILIATION TO THE FELLOWSHIP OF MEDICINE.—The difficulties incidental to attendance on a post-graduate clinic at a centrally-situated hospital have made it almost impossible for many London practitioners to attain readily the up-to-date knowledge they require, and it was the realisation of that difficulty which led to the formation of the South-West London Post-Graduate Association a few months ago. The weekly demonstrations and lectures, given in February and March, were well attended, which makes it evident that the Association meets a real want in the district. A further development has now taken place in the affiliation of the Association to the Fellowship of Medicine. The Council of the Fellowship, realising that it would be mutually advantageous for the central post-graduate organisation to be linked up to the outlying associations, suggested the affiliation which was readily agreed to. It is hoped that in course of time similar associations may arise in the various outlying districts of London and by their connexion with the central Fellowship may be welded into a coördinated but decentralised system of post-graduate study.

The programme for the summer session of the South-West London Association comprises a series of lecture-demonstrations on common errors in diagnosis. At the first meeting on May 3rd, at 4 P.M., Dr. Wordsworth Barber will demonstrate Common Errors in Diagnosis of Skin Diseases. The lectures and demonstrations are open to all practitioners: there is an annual subscription of one guinea to cover working expenses.

LADIES' MEDICAL GOLFING SOCIETY.—The spring meeting will be held on Friday, May 5th, at Porters Park Golf Club, Radlett, Herts.

LONDON SCHOOL OF HYGIENE.—The Rockefeller Foundation has now acquired, on the recommendation of the Minister of Health, a site in Bloomsbury for the proposed London School of Hygiene. This site is bounded by Gower-street, Keppel-street, and Malet-street, and adjoins the land reserved by the Government for the new buildings of the University of London.

EUGENICS EDUCATION SOCIETY.—A lecture on a Guiding Principle of Practical Eugenics Reform will be delivered by Dr. C. V. Drysdale, D.Sc., at the rooms of the Royal Society, Burlington House, Piccadilly, London, W., to-day, Friday, April 28th, at 5 P.M., Major Leonard Darwin will preside. Members of the society and all interested in the subject are invited to attend.

INVALID CHILDREN'S AID ASSOCIATION.—The annual meeting of this association will be held at Crewe House, Curzon-street, on May 2nd, at 3 P.M. Lord Burnham will preside, and Mr. H. S. Souttar and Dr. D. M. Barcroft will be among the speakers. Tickets are necessary for admission and may be obtained from the secretary, 117, Piccadilly, London, W. 1.

SMALL-POX IN THE PENNINE DISTRICT.—Ten fresh cases of small-pox have been notified in Oldham within the past fortnight. This makes a total of 35 cases since the beginning of the outbreak in February. Eleven cases, including five members of a Belgian family, have been isolated at Todmorden. Three mild cases, discovered in the Meersbrook district of Sheffield, are now isolated in Hallwood Sanatorium.

RONTGEN SOCIETY.—A general meeting will be held on May 2nd, at 8.15 P.M., in the Institution of Electrical Engineers, Savoy-place, Victoria Embankment, London, W.C. 2, when the following kinematograph films will be exhibited: (1) "Preparation of Radium from Carnotite Ore," illustrating the mining and transportation of the ore and the extraction of radium from it. Exhibited by Messrs. Watson and Sons (Electro-Medical), Ltd. (2) "X Rays," dealing with their uses. Exhibited by The British Thomson-Houston Co., Ltd.

Sir F. J. Willis, the Chairman, and Mr. A. H. Trevor and Dr. A. Rotherham, two Commissioners of the Board of Control, having been appointed to hold a sworn inquiry into the allegations of ill-treatment on the part of certain attendants at Long Grove Mental Hospital, Epsom, which were made by Mr. Cox, an ex-inspector of police, before Sir Cyril Cobb's Committee, the inquiry was opened at the hospital last Monday, April 24th, and concluded on the 25th. The main charges of cruelty and poisoning were found to be untrue though made in good faith. Emphasis was laid on the inadvisability of jesting remarks being made by attendants which might be misinterpreted by patients.

AMALGAMATION OF NORWICH HOSPITALS.—A scheme for amalgamation of the Norfolk and Norwich Hospital and the Norfolk and Norwich Eye Infirmary is about to be carried out. During the last quarter the number of in-patients admitted to the Norfolk and Norwich Hospital was 93 discharged soldiers, as against 103 in the same period last year, and 665 civilians, as against 605. The number of operations performed was 694; 900 new out-patients were treated, and 1450 accidents and casualties. In the corresponding period of last year these figures were 522, 791, and 1650 respectively. The finances of the hospital are in a satisfactory condition, the donations for last year having amounted to £11,000, nearly double the amount of the previous year. At the present time about 360 parishes, 161 county firms, and 450 city firms are contributing to the Hospital Saturday and Sunday Fund. At the annual meeting of the Governors, the chairman of the board of management said that the hospital badly wanted lifts by which stretcher patients could be taken from one floor to another. When the amalgamation with the Eye Infirmary becomes an accomplished fact it is proposed to utilise the present Eye Infirmary building, which is just across the road, as additional accommodation for nurses. The Norfolk and Norwich Eye Infirmary has now completed 100 years of work, having been founded in 1822. During last year the in-patients numbered 247, against 262 in the previous year, and the attendance of out-patients was 5376, an increase of 75 upon the number recorded in 1920. The Committee report that although the working expenses of the institution have increased, the debit balance recorded last year has been wiped out, and a surplus of £392 11*s.* 9*d.* established. This result was largely due to the contributions from patients, which amounted altogether to £332 17*s.* 5*d.*

LITERARY INTELLIGENCE.—The University of London Press, Ltd., announce the early publication of a popular volume entitled "Suggestion and Mental Analysis," by Dr. William Brown. The book is a brief summary of modern methods on mind cure, containing an appreciation and criticism of the views of Mr. Coué.

ELECTION OF MEDICAL ADVISORY COMMITTEE AT WILLESDEN.—A meeting of members of the Willesden division of the B.M.A. and others was held at St. Andrew's Parish Hall, Willesden Green, last Tuesday, April 25th, when approval was bestowed upon the election of a representative Medical Advisory Committee which shall deal with the Health Committee of the Willesden U.D. Council on all matters which affect the public health of the district. The constitution of the Committee is to be as follows: One consultant, nine general practitioners, and one whole-time medical officer all elected by medical men and women resident in the district. Nominations were handed in for two consultants, 14 general practitioners, and one whole-time officer. The last-named, Dr. Rachel Gethen, was elected, and a postal vote will be taken on Monday next for the other vacancies.

DONATIONS AND BEQUESTS.—By will the late Mr. John Grey, of Southport, bequeathed £500 each to the Rochdale Infirmary, the Rochdale Adult Deaf and Dumb Society, and to the Blind Asylum, Old Trafford.—Under the will of the late Mr. George Sheward, of Knightsbridge, a sum of over £300,000 will be divided between the London, St. Bartholomew's, and Middlesex Hospitals.—By the will of the late Mrs. Ada Waltz, of Kensington, the Charing Cross Hospital will receive £3000 for the founding of memorial beds.—Under the will of the late Alderman Sir James Edward Jones, of Rochdale, the testator left among other large bequests £500 each to the Royal Schools for the Deaf and Dumb, Manchester, Northern Counties Hospital for Incurables, Rochdale and District Adult Deaf and Dumb Society, Rochdale Infirmary, Rochdale District Nursing Association, Manchester Royal Infirmary, the British Red Cross Society and the Order of St. John of Jerusalem, and Rochdale Crippled Children's Home. In the event of the failure of certain trusts the Northern Counties Hospital for Incurables will benefit by the sum of £2000, the Manchester Royal Infirmary by £6000, and the British Red Cross Society by £4000.

Appointments.

WARBURTON, G. B., Ch.M., F.R.C.S. Eng., has been appointed Visiting Surgeon, Withington Institution and Hospitals, Manchester.

YULE, G. P., M.D., C.M. Edin., B.Sc. (Pub. Health), Medical Officer for the Burgh of Lochgelly.

Vacancies.

For further information refer to the advertisement columns.

Bath, Ministry of Pensions Hospital.—Pathologist. £600.
Birmingham General Hospital.—Two H.S.'s. Each £100.
Bristol Royal Infirmary.—Hon. Med. Reg. and Hon. Surg. Reg.
Canning Town Women's Settlement Hospital, Balaam-street, Plaistow.—Res. M.O. £150.
Dorset Mental Hospital, nr. Dorchester.—Third Asst. M.O. £300.
Eccles and Patricroft Hospital.—Res. H.S. £200.
Fulbourn, nr. Cambridge, County Mental Hosp.—Asst. M.O. £220.
Grimsby County Borough.—Asst. M.O. £500.
Guildford, Royal Surrey County Hospital.—H.S. £150.
Harefield, Middlesex County Tuberculosis Sanatorium.—Second Asst. Res. M.O. £400.
Hospital for Sick Children, Great Ormond-street, W.C.—Med. Reg. and Path. £300. H.S. £100.
Hull Royal Infirmary.—Sen. H.S. £200.
Ipswich, East Suffolk and Ipswich Hospital.—S. £150.
Kensington and Fulham Hospital, Earl's Court.—Res. M.O. £200.
King's College Hospital, Denmark Hill, S.E.—Jun. Orth. S. and Jun. S.
Leamington Spa, Warneford, &c., General Hospital.—Res. H.P. £150.
Leeds Public Dispensary.—Hon. Ophth. Surg.
Leicester Isolation Hospital and Sanatorium.—Asst. Res. M.O. £350.
Liverpool, Royal Southern Hospital.—Hon. Asst. S.
London Temperance Hospital, Hampstead-road, N.W.—Res. M.O. £200. Med. Reg. 40 gns.
Manchester, Ancoats Hospital.—Anæsthetist. 10*s.* 6*d.* per attendance.
Manchester Children's Hospital.—Orth. S. £50.
Mildmay Mission Hospital, Austin-Street, Bethnal Green, E.—Res. M.O. £120.
Miller General Hospital, Greenwich-road, S.E.—Res. Cas. O. £200.
Queen's Hospital for Children, Hackney-road.—Two Cas. H.S.'s. £100 each.

Royal Dental Hospital, Leicester-square.—House Anæsth. 10s. 6d. per attendance.
Royal Free Hospital, Grays Inn-road, W.C.—Asst. P.
Royal London Ophthalmic Hospital, City-road, E.C.—Second H.S. £125.
St. Albans, Napsbury Mental Hospital.—Temp. M.O. 7 guineas weekly.
St. Mark's Hospital for Cancer, &c., City-road, E.C.—Hon. P.
Southampton Poor-Law Infirmary, Shirley Warren.—Med. Supt. £500.
Southport General Infirmary.—Jun. H.S. £175.
Stockport General Infirmary.—Asst. H.S. £175.
Sunderland Royal Infirmary.—H.P. £200.
Surrey County Council.—Asst. M.O. £700.
Swansea General Hospital.—H.P. £200.
Victoria Hospital for Children, Tite-street, Chelsea.—Cas. Sorting O. and Anæsth. £150.
Wakefield, Clayton Hospital.—H.S. £225.
Walthamstow, Wanstead, &c., General Hospital.—Vacancies on Hon. Visiting Staff.
Weir Hospital, Grove-road, Balham.—Res. M.O. £200.
West London Hospital, Hammersmith-road.—Non-Res. Cas. O. £5 5s. per week.
Winchester, Royal Hampshire County Hospital.—H.S. £150.
Windsor, King Edward VII. Hospital.—Sen. H.S. and Jun. H.S. £200 and £150 respectively.
Wolverhampton, Borough of.—Asst. M.O.H. £500.
Wolverhampton, &c., General Hospital.—H.S. £200.

The Chief Inspector of Factories, Home Office, London, S.W., announces the following vacant appointment: Neilston (Renfrew).

The Secretary of State for the Home Department gives notice of a vacancy for a Medical Referee under the Workmen's Compensation Act, 1906, for the Abingdon, Faringdon, Reading, Wallingford, Wantage, Banbury, Oxford, Thame, and Witney County Courts in Circuit No. 36. Applications should be addressed to the Private Secretary, Home Office, S.W., and should reach him not later than May 13th, 1922.

Births, Marriages, and Deaths.

BIRTHS.

BALLS.—On April 20th, the wife of Mr. H. G. Balls, L.D.S. Eng., Cumberland-place, Southampton, of a daughter.

BENSON.—On April 15th, at Marwell Lodge, Church Crookham, Hants, the wife of Major C. T. Vere Benson, R.A.M.C., of a son.

MACINTYRE.—On April 19th, at Overton-drive, Wanstead, Essex, the wife of Donald MacIntyre, M.C., M.D., D.P.H., of a daughter.

MCSHEEHY.—On April 15th, at Sunnyside, Wimbledon, the wife of Major O. W. McSheehy, D.S.O., O.B.E., R.A.M.C., of a son.

MARRIAGES.

GARROD—PIERCE.—On April 22nd, at Old Jordans Meeting House, Lawrence P. Garrod, M.B., B.Ch. Camb., son of Mr. and Mrs. Cubitt Garrod, of Bournemouth, to Marjorie Pierce, M.R.C.S., L.R.C.P., only daughter of Bedford Pierce, M.D., F.R.C.P., and Mrs. Pierce, of Malton (formerly of York).

JONES—BAILE.—On April 19th, at the Church of Ireland, Tralee, J. G. Llewellyn Jones, M.B., Ch.B., to Olive Baile, M.B., eldest daughter of the late Rev. George Baile, B.A., LL.B., C.F.

DEATHS.

CHEYNE.—On April 9th, at Ravensbourne, Melrose, suddenly, Margaret, wife of Sir William Watson Cheyne, Bt., M.P.

MACLEOD.—On April 18th, at Raasay Lodge, Oban, Roderick Macleod, M.D., late I.M.S., in his 83rd year.

POTTS.—On April 17th, at the London Hospital, William James Potts, M.D. Lond., aged 54 years.

N.B.—A fee of 7s. 6d. is charged for the insertion of Notices of Births, Marriages, and Deaths.

Medical Diary.

Information to be included in this column should reach us in proper form on Tuesday, and cannot appear if it reaches us later than the first post on Wednesday morning.

SOCIETIES.

ROYAL SOCIETY, Burlington House, London, W.
THURSDAY, May 4th.—List of probable papers: C. Shearer: On the Heat Production and Oxidation Processes of the Echinoderm Egg during Fertilisation and Early Development. H. Hartridge and R. A. Peters: Interfacial Tension and Hydrogen-ion Concentration (communicated by Mr. W. B. Hardy, Sec., R.S.). W. Cramer, A. H. Drew, and J. C. Mottram: Blood-platelets and their Behaviour in "Vitamin A" Deficiency, and after "Radiation" and their Relation to Bacterial Infections (communicated by Prof. W. Bulloch).

ROYAL SOCIETY OF MEDICINE, 1, Wimpole-street, W.

MEETINGS OF SECTIONS.

Monday, May 1st.

TROPICAL DISEASES AND PARASITOLOGY: at 8.30 P.M.
Annual General Meeting:
Election of Officers and Council.
Address:
Sir Leonard Rogers: The Ætiology and Epidemiology of Leprosy.
Papers:
Mrs. F. E. Philpot: The Development of Oxyuris. Dr. J. Anderson: Dysentery in the West Indies. Dr. Powell: Tuberculosis in the Tropics.

Tuesday, May 2nd.

ORTHOPÆDICS: at 5.30 P.M. (Cases at 5 P.M.)
Annual General Meeting:
Election of Officers and Council.
Cases will be shown by Mr. Fairbank and others.

Wednesday, May 3rd.

UNIVERSITY OF LONDON ADVANCED LECTURE IN MEDICINE: at 5 P.M.
Prof. C. Winkler, Professor of Clinical Psychiatry in the University of Utrecht: The Human Neo-Cerebellum. The lecture will be delivered in English and will be free, without ticket.

Thursday, May 4th.

OBSTETRICS AND GYNÆCOLOGY: at 8 P.M.
Annual General Meeting:
Election of Officers and Council.
Specimen:
Prof. H. Briggs: Uterus from case of Anæmia.
Short Communication:
Mr. M. Donaldson: Description of an Operation for Radiation of Iliac Glands and Deep Tissues in Carcinoma.
Paper:
Mr. J. D. Malcolm: Surgical Shock.

SURGERY.
THERAPEUTICS AND PHARMACOLOGY.
Members of these Sections are cordially invited to be present and to take part in the discussion of the above papers.

Friday, May 5th.

LARYNGOLOGY:
Special Clinical Meeting at 3 P.M.
Cases and specimens will be shown by Sir StClair Thomson, Mr. Tilley, Dr. Frederick Spicer, Dr. Dan McKenzie, Dr. Irwin Moore, Mr. Howarth, Mr. E. D. D. Davies, Mr. Archer Ryland, Dr. A. R. Tweedie, Mr. J. F. O'Malley, and others.
Annual General Meeting:
Election of Officers and Council.
Annual Dinner at the Trocadero Restaurant, W. 1, at 7.45 P.M.

MEDICAL SOCIETY OF LONDON, 11, Chandos-street, Cavendish-square, W.
MONDAY, May 8th.—8 P.M., Second General Meeting, 9 P.M., Annual Oration by Mr. H. J. Waring, to be followed by a Conversazione.

LECTURES, ADDRESSES, DEMONSTRATIONS, &c.

ROYAL COLLEGE OF PHYSICIANS OF LONDON, Pall Mall East.
TUESDAY, May 2nd.—5 P.M., First Oliver-Sharpey Lecture. Prof. E. Mellanby: Some Common Defects of Diet and their Pathological Significance.
THURSDAY.—5 P.M., Second Oliver-Sharpey Lecture.

FELLOWSHIP OF MEDICINE POST-GRADUATE LECTURES, Royal Society of Medicine Lecture Hall.
MONDAY, May 1st.—5 P.M., Sir Humphry Rolleston: Recent Physiology of the Liver and its Application in Practice.

WEST LONDON POST-GRADUATE COLLEGE, West London Hospital, Hammersmith-road, W.
MONDAY, May 1st.—2 P.M., Dr. Simson: Diseases of Women.
TUESDAY.—2 P.M., Dr. Burrell: Medical Out-patients.
WEDNESDAY.—2 P.M., Mr. Tyrrell Gray: Operations.
THURSDAY.—2 P.M., Mr. Bishop Harman: Eye Department.
FRIDAY.—10 A.M., Mr. Dudley Buxton: Dental Department.
SATURDAY.—9 A.M., Dr. Burnford: Bacterial Therapy Department.

LONDON LOCK HOSPITAL, 91, Dean-street, W.
MONDAY, May 1st.—5 P.M., Mr. Charles Gibbs: Anterior and Posterior Urethritis.

SOUTH-WEST LONDON POST-GRADUATE ASSOCIATION, St. James' Hospital, Ouseley-road, Balham.
WEDNESDAY, May 3rd.—4 P.M., Dr. Wordsworth Barber: Common Errors in Diagnosis in Regard to the Skin.

INSTITUTE OF PATHOLOGY AND RESEARCH, St. Mary's Hospital, W.
THURSDAY, May 4th.—5 P.M., Sir A. E. Garrod: More Inborn Errors of Metabolism.

MANCHESTER ROYAL INFIRMARY POST-GRADUATE CLINIC.
TUESDAY, May 2nd.—4.30 P.M., Dr. G. R. Murray: Pneumonia.

MANCHESTER FRENCH HOSPITAL POST-GRADUATE LECTURES, 24, Acomb-street, Whitworth Park.
THURSDAY, May 4th.—4.30 P.M., Mr. A. C. Magian: Face Presentations.

Notes, Short Comments, and Answers to Correspondents.

SENESCENCE AND SENILITY.

BY R. J. C. THOMPSON, M.D. DURH., M.R.C.P. LOND.,
MAJOR, R.A.M.C.;
AND
R. E. TODD, M.B., B.S. LOND., M.R.C.S.,
MAJOR, R.A.M.C.

PROBLEMS connected with old age have interested all generations. From perusal of the literature on the subject, it would seem that certain general principles in dealing with the aged are well recognised, but in actual practice they are often forgotten or ignored. This paper, based on two years' collaboration at the Royal Hospital, Chelsea, is not intended to be a full scientific treatise, but a simple expression of what we believe to be the basic principles underlying old age and rational methods of retarding premature decay. We have been in medical charge of a population of 500 veterans, averaging 73·3 years of age, with 22 per cent. aged 80 years and over.

We have very few reliable data bearing on the factors which conduce to longevity.

Heredity.—Long-lived parents, particularly the mother, would seem to have long-living children, as a rule, but we have not sufficient evidence as to the causes of early death in the parents. It may be taken for granted that, under anything like favourable conditions, good stock begets good stock.

Hardship.—We are doubtless dealing at Chelsea with the survival of the fittest. But hardship, per se, appears to have no deleterious effect. In fact, the medals of the older campaigns, Crimea and Mutiny, are badges of the "sturdy independent" who plays his innings to the end.

Syphilis.—Previous history is often quite unreliable, but amongst the oldest men we have found no signs of syphilitic infection.

Alcohol and Tobacco.—Apart from idiosyncrasy, we have no reason to think that either has a specific deleterious effect on the normally sound constitution. A Crimean veteran, aged 85, recently developed subacute delirium tremens on return from furlough, and made an excellent recovery.

Diet.—The old men eat enormously as a rule. Lack of teeth does not spell indigestion at the Royal Hospital. We are frequently amazed at the quantity of solid food which an old man will comfortably dispose of.

Unnecessary Invalidism.

At an early stage in our service at the Royal Hospital we were impressed by, and deplored, the amount of unnecessary invalidism among in-pensioners and the even greater amount among admissions from out-pension to the Royal Hospital. Some who had had a wound, injury, or illness—often with insufficient or inefficient treatment—had lost their elementary stimuli and given themselves up to a life of invalidism, of premature and preventable decay. They had lost self-reliance, the iinstinct of self-preservation, and—all too often—self-respect. Such men become an intolerable nuisance in their homes, and drift into institutions as chronic "incurable" invalids. We have found that, in many cases, the physical condition as described by the patient and his friends is not supported by clinical findings, and that it is possible to do a great deal for this type of case. Much time and patience are required and it is thankless work; more often than not the patient resents curative treatment and prefers to be left to "rot" in his own way.

A pensioner, aged 41, who had been wounded in the South African War by a bullet through the frontal lobes, had been practically bedridden since 1902. He became so tyrannical in his home, and so great a nuisance to his mother, that application was made for his admission to the Royal Hospital. He was admitted in a profoundly neurasthenic state, alleging that he was practically unable to walk. After two months in the infirmary of the Royal Hospital he became physically fit to earn his own living. He deserted from Chelsea, and walked to Newbury!

Definition of Old Age.

It is very difficult to give a clear definition of old age. Some men are old by the time they reach 60, others are physically and mentally active at 80; old age cannot be assessed by the sum total of man's years. The Psalmist's "three score years and ten" has been too literally accepted: the "too old at forty" gospel has not helped to dispel the fallacy, and there is too great a tendency for men reaching a certain age to persuade themselves that, ipso facto, they have reached the last page of the book. They seem to think that they have attained an age at which a man should relinquish his activities, both physical and mental. Old age, as we see it, is not mere physical deterioration, but may be expressed by the equations: (1) Physical deterioration = senescence; (2) physical deterioration + lowered mentality = senility.

During two years 169 deaths have occurred among the in-pensioners. The average age at death was 77·2 years; the causes are tabulated at the end of this article. We have held autopsies on the majority of these cases, both to check diagnosis and to satisfy ourselves that clinical treatment had been reasonably complete. Constant pathological changes have been found in the cardio-vascular system, degeneration of heart muscle and arterial lesions, general or localised. We have particularly remarked cases of localised arterial degeneration, as some men who have exhibited "pipe-stem" radial arteries have not shown comparable arterial changes in other parts. It is easy to understand that general vascular degeneration leads to malnutrition and consequent deterioration of *all* the tissues of the body. It is equally logical that some localised lesions have their effect in determining the reactions of the body to hormonic influences. To blame any one or all of the endocrine glands as being the primary cause of old age seems to us to be placing the cart before the horse. Cardio-vascular degeneration, the failure of the mechanical factor, on which the constant strain has been exerted through life seems, a priori, a sufficient and simpler explanation in the absence of direct proof to the contrary.

Psychic Factors Determining Senility.

Apart from the physical and mechanical side, the factors which, in our view, determine senility are the subtle, psychic changes which are evidenced by gradually lapsing sympathetic control, and the loss of balance between the sympathetic and para-sympathetic systems. Para-sympathetic activity is the first to develop, the last to lapse. It is maintenance of the equilibrium between the "vagal" and sympathetic systems which determines the normality of the adult, and our aim has been, in dealing with the problems connected with old age, to help to maintain this balance as long as the mechanical factor can reasonably fulfil its function.

Normal old age should be a physiological change of a not unpleasant nature. It is the wilful-woeful, helpless-hopeless attitude of the individual which makes old age hideous, culminating only too often in premature senile dementia. A slight accident or illness may be magnified by suggestion or auto-suggestion into being the final crisis: the patient and his friends appear to regard it as almost unseemly that he should "get better at his age!" Many old people are easily persuaded to take a morbid interest in being helpless, and soon learn to enjoy being the coddled centre of attraction, a subject for commiseration and mistaken sympathy which finally produce the self-centred abstraction so common among the aged.

Hysteria, the condition induced by suggestion, and curable by persuasion, is, we find, unexpectedly common among the old men. For instance, an ancient watching another who cannot walk easily suggests to himself that he also cannot walk. After examining petechial patches on the dorsum of the foot of a patient, aged 83, we found, the following morning, that the old man was holding his foot in the equino-varus position and insisting that he had lost the use of the leg. The treatment of such functional cases is simple and successful; the patient's dinner is placed at the other end of the ward, and the man can only reach it by walking to the table. It is, of course, as necessary to eliminate any organic basis in these cases as it is important not to humour the "functional lesion." As long as a man, whatever the number of his years, responds to the "elementary stimuli"—self-reliance, the instinct of self-preservation, and self-respect—*he does not suffer from old age.* A man whose sympathetic nervous system remains tuned to the above "stimuli," is, whatever his age, not out of harmony with his surroundings. A man whose sympathetic nervous system has lost tone, or is exhausted, suffers from what we describe as "lowered mentality" in our old age equation.

Hospital surroundings undoubtedly have a tendency to induce moral and physical deterioration in the aged; do anything for an old man which he can do for himself, and he will very soon persuade himself that he can no longer do it.

Dangers and Uses of Bed.

We have no doubt that the aged should be kept *out* of bed as far as possible. An old man, kept in bed unnecessarily, often becomes dirty in his habits, and is in danger of hypostatic pneumonia, particularly when he is the subject of lung affections, such as chronic bronchitis, emphysema, &c.

We regard it as necessary to have those acutely ill under direct medical care, as it is important to keep those not in need of nursing away from the suggestive atmosphere of hospital surroundings. Admission to hospital suggests to

many of our old men that they are "on the departure platform for Brookwood Cemetery," that "it is the final canter to Woking." It lowers the morale of an old man to keep him unnecessarily in an atmosphere of helplessness and suffering. Further, the rusting mechanism of the cardio-vascular system, if left to rest too long, refuses to perform, when called upon to do so, what had been its accustomed routine. Unless there are strong indications to the contrary, such as an acute toxæmic affection, to produce a state of muscle inertia, in which the myocardium partakes, is tantamount to cutting off the vital stimuli necessary to the performance of such duties as even a degenerated heart-muscle has performed, can perform, and is tuned to perform. A strong argument against keeping an old man in bed is, we find, the practical impossibility, even in an institution, of preventing "pressure sores." The skin, atrophic and malnourished arterially, has, in some cases, broken through in less than 12 hours. The buttocks, the heels, elbows, any thinly-covered bony prominence, may give way under the slightest pressure, and we have seen a case amounting to ante-mortem decomposition.

The attitude towards the patient in hospital must be cheerful and optimistic. An atmosphere of cheeriness is most important in giving confidence in his treatment and sustaining his self-confidence, thus fostering the determination in his own mind that the issue of his illness is likely to be favourable. In this regard, a great responsibility rests with the visitors who are allowed to see the patient. Commiseration and misguided sympathy may completely upset an old man's mental outlook. An injudicious visitor can, in a few minutes, stultify the medical work of days and reduce the patient to a state of non-resistant gloom and despair. The philanthropist whose only largesse is commiseration is an unmitigated nuisance; the misapplication of so-called "sympathy" does nothing but demoralise old age. In no case have we seen a single instance where the moist eye and mournful shake of the head have helped either the patient or those responsible for his real welfare. It has been instructive to remark the dislike of sturdy independents to the attempted coddling of well-meaning visitors. To quote a Crimean veteran playing a good innings of 86: "I wish these blasted women would leave me alone."

A type of case which must be nursed in bed is the intensely toxæmic lobar pneumonia, owing to the failure which threatens the heavily poisoned and already degenerated heart. But broncho-pneumonia—so common as the flame which bursts from smouldering chronic bronchitis—is, we believe, almost inevitably fatal if the patient is kept in bed. In such cases the mechanical, rather than the toxæmic, factors appear to act more powerfully, and change of position and relief of pressure are undoubtedly therapeutically necessary. The patients are less distressed when in an armchair; they sometimes ask to be allowed to sleep in an armchair, and the suggestion of being out of bed is of undoubted psychic value. The excretory functions work better; fæces and urine are more easily voided. Rest is promoted, as the inducement to sleep after getting back to bed is greater than if the patient is kept there constantly.

We are often amazed at the powers of resistance of the degenerated human machine, and at the length of time for which life can be sustained by a mechanism practically worn out, which may be coaxed to continue work, but for which no spare parts are available. When definite signs of a failing reserve are apparent we take the patient under our immediate care to help him over a threatening critical period, for it is more important in old age than during any other period of life to treat the individual and not the diagnosis. A strong indication for admission to hospital is the patient's complaint that he feels "tired," "done up," "is off his food," "has no life in him." In many such cases a day in bed, with hot-water bottles and light easily digested nutriment, suffices to tide over an impending crisis and reinforce the threatened reserve of the mechanical element in vital energy. Why a day's rest in bed should operate so powerfully in such cases, and indeed at all ages, it is difficult to explain, apart from the mechanical factor, unless perhaps the resting body is better enabled to produce the antibodies necessary to combat a new, or added, infection.

Lung Lesions.

We have reason almost daily to remember that chronic bronchitis and broncho-pneumonia, as distinct diagnoses in the aged, are *ab initio* often impossible to make, the one merging imperceptibly into the other. The chronic bronchitic who reports sick with even a slightly raised temperature is a patient to be regarded and treated seriously as a case of potential, if not developed, broncho-pneumonia. Apyrexia does not rule out broncho-pneumonia; we have seen a fatal case, confirmed at autopsy, where temperature was subnormal throughout the course of the illness. It is often impossible from physical signs to discriminate accurately between the various lung lesions found in the aged; the confused medley of adventitious sounds in an old man's thorax makes it impossible to distinguish the classical signs of text-book disease. Active tuberculous lesions have not infrequently been found, post mortem, in the lungs when the usual signs of phthisis were not demonstrable during life. As practical points in clinical treatment, we have found that the majority of so-called "bronchial asthma cases" are benefited and the spasm controlled by injections of atropine gr. 1/100 given in the early morning.

Benzyl-benzoate, in cases of the secondary arterio-sclerotic (chronic renal) type of asthma, has given most encouraging results. It also seems to relieve enterospasm, and in two cases has been the only drug with any effect on otherwise uncontrollable hiccough of unexplained origin in men of 84 years of age.

Heart Disease.

In so brief a note we cannot attempt to discuss fully many common diseases in terms of old age. We have already alluded to the apparently constant degenerative changes in the myocardium seen at autopsy. In some cases the muscle wall, especially of the right ventricle, has been so thinned as to give the impression that the wall was made up of visceral pericardium and pericardial fat. Auricular fibrillation is, as might be expected, common among the aged, usually without demonstrable valvular lesion.

In our cases gross irregularity of rhythm and force of beat have been more noticeable than the usually associated rapidity of action. In an exceptional case, aged 84, irregularity was associated with a pulse-rate of 130, uncontrolled by digitalis in large doses. We have found that a formula such as the following—

℞	Tinct. digitalis (up to)	minims xv.
	Tinct. nucis vomicæ	minims vi.
	Ammon. carb.	gr. iii.
	Aq. camphoræ ad	℥i.

quartis horis.

gives rapid and excellent results. It is often advisable, as a measure of urgency, to initiate treatment with an injection of digitalin, gr. 1/100, either subcutaneously or intravenously. As soon as the gross irregularity is controlled, the above formula, with smaller doses of tincture of digitalis, can be adopted as a routine measure to keep the heart's action at a comfortable level, the patient being seen at regular intervals after discharge from hospital.

The most distressing heart cases we have seen have been in three comparatively young men with gross aortic incompetence and cor bovinum. Until compensation failed these men did not complain, but as soon as their reserve gave way they became acutely distressed and exhibited symptoms akin to acute mania. Their discomfort, apprehension, and insomnia could only be allayed by injections of morphia, a drug which prolongs life in these cases and, what is far more important, makes continued existence tolerable. Our cases of mitral valvular disease in the aged have exhibited no features of special interest.

We have not seen a single case of true angina pectoris, but what has been described as abdominal angina is not an unusual feature in cases which reveal, at autopsy, advanced atheroma of the aorta and coronary arteries. The subjective signs, attributable to general arterial deterioration, are, in our experience, seldom complained of. The objective phenomena usually first bring the patient under notice. Meeting so many cases of obviously marked arterio-sclerosis, we expected to find a large series of cases showing very high blood pressure; but the reverse is the actual case. The explanation is, doubtless, that the period of high pressures has been passed in middle age when a forcible heart was acting against degenerating arteries. This is the prelude to the general cardio-vascular degeneration, which we find so constantly established in old age—the era of lowered pressure of a completely faulty machine.

Malignant Growths.

It will be seen that malignant disease—neoplasm—has accounted for 13 per cent. of the deaths during two years. With cases of inoperable carcinoma there comes the time when physical misery dominates the picture; we can find no excuse for withholding morphia sufficient to submerge the patient's discomfort and misery. We have heard it stated that doses of morphia sufficient to effect this purpose shorten the patient's life; we believe, however, that in many cases the comfort given and sleep gained lengthen life. Morphia undoubtedly conduces to the sufferer's comfort and confidence, and during institutional treatment it prevents the detrimental effects, on other patients, of visible suffering and the suggestion of a painful end. Morphia is, we gather, not infrequently withheld as being the thin end of the euthanasic wedge: we wish to emphasise our view that it is inexcusable to allow unnecessary suffering when the obvious panacea is available. One learns in an institution for the aged that death is, more often than not, "le bienvenu," and we can find no slightest reason why its advent should be made hideous.

Other Morbid Conditions.

Varicose Ulcers.—These heal readily in men of over 80. Our general practice is to clean the surface with fomentations for two or three days, then to cover the ulcer with a slightly larger piece of thin rubber tissue, over which is lightly bandaged a thick pad of wool saturated, and kept moist, with weak Sanitas solution. The rubber is removed every 48 hours, cleansed, and reapplied after the surface of the ulcer has been very lightly swabbed. The patients are not kept in bed, but are moved into armchairs during the day with stools on which the leg is rested.

Senile Gangrene.—We inspect the feet of all in-pensioners weekly, and take senile gangrene under treatment early. Destruction of tissue can usually be strictly limited by resting the limb and keeping the part dry. Three cases of moist gangrene have occurred, with fatal results, in patients whose urine contained sugar. Our weekly inspections also enable us to locate cases of early rodent ulcer, and carcinoma of superficial structures, and to offer the patient the opportunity of operation while the growth is operable—an opportunity of which he by no means always avails himself. The members of the Cancer Hospital staff have always been most kind and helpful to our old men.

Bladder.—We have been called upon to deal with surprisingly little bladder trouble. Two cases of foul chronic cystitis have been made more comfortable by regular bladder washing. Retention of urine suddenly occurring during the course of an illness is always of grave prognostic import. But men who have "reported sick" with inability to "pass their water" have usually regained the function after, in some cases, weeks of careful daily catheterisation. It would seem that these cases of retention have been due to sheer atony of the bladder wall; no urethral or prostatic obstruction has impeded the passage of large metal catheters, and the function has been completely regained. A recent instance was in a Mutiny veteran aged 85.

Quack Medicines.—Many of our old men take a keen, and regrettable, interest in the advertisements of patent and proprietary medicines. The continued suggestion contained in the syllabus of symptoms has a distinctly harmful effect. An old man will produce for inspection a cutting from a newspaper which contains a list of 20 questions ranging from "Does your nose itch?" to "Do you cough on waking in the morning?" and, almost triumphantly .... "I've got *all* of them!" They are half-frightened, half-gratified, by pills which turn the urine green or blue: "It don't look natural to me, but I s'pose it's the impurities washed out o' me system."

Chronic Constipation.—This condition is responsible for many of the ills of old age. We have had patients, whose epileptoid fits, maniacal outbursts, long-standing anorexia and generalised pains have been completely and permanently cured by regular attention to the bowels. We have observed frequently, post mortem, the presence of stony-hard scybalous masses in the colon even in men whose "bowels were well and regularly open." Presumably the more liquid fæcal matter forced a way past the impacted scybala. It appears that the normal expulsive reflex of the rectum becomes dulled and finally lost in old age, the rectum and colon becoming atonic. Certainly we find that enemata are more helpful than all the usual purgatives put together. A single enema may suffice to overcome an early constipated habit. A routine dose daily of liquid paraffin and liquid extract of cascara ää ʒi. relieves many cases. The more obstinate cases require routine enemata, once or twice every week; routine enemata seem more rational than routine aperients in dealing with the obstinate constipation of old people. The atonic colon is at fault to a greater extent than the small intestine, and mechanical emptying of the rectum by means of enemata gives better results than the continual goading of the small intestine.

Ears.—Examination of the ears has revealed the fact that the majority of our old men had concretions of cerumen blocking the external meatus. Common complaints are of "feeling giddy," "singing in the ears," and "buzzing feeling in the head." Removal of the wax from the ears by syringing nearly always cures the symptoms and obviates the necessity for suspecting intracranial lesions. The deafness caused by plugs of cerumen produces a definite type of mental dullness which can be rapidly alleviated by syringing, and cured by repeating the treatment at regular intervals.

Eyes.—Eyesight means so much to the old men that the fitting of suitable spectacles is an important factor in their well-being. Complicated refractions, operative measures, &c., have been most kindly undertaken with very helpful results, by the ophthalmic surgeons of St. George's Hospital, and by the eye specialist stationed at Queen Alexandra's Military Hospital, Millbank. We have been quite unable to induce the blind men of the old army to undertake any form of distraction to occupy hands or thoughts. In this connexion we have noted, particularly, that *the aged with blindness of long-standing do not drift into senile dementia.* Our observations are limited in number, but it seems reasonable that this should be so—the man has been forced to make efforts to fend for himself; his instinct of self-preservation has sharpened his other senses, and he has survived owing to the continued high tone of his sympathetic nervous system which maintains its tuned-up efficiency.

Teeth.—We do not remember having seen a single tooth in healthy condition among our old men. Those who have natural teeth are so affected with pyorrhœa that they would be a great deal better with edentulous gums. They are most averse to having teeth extracted until the latter cause pain or "become so wobbly" as to be a nuisance; a man will obstinately retain a single tooth in his head and persuade himself that it is both useful and ornamental. We do not recommend the supply of artificial teeth if the tough, hardened, edentulous gums can be made to meet in close apposition. In two and a half years we have had to recommend dentures for two men only, with limited movement of the temporomandibular joints which prevented closure of the edentulous jaws.

Feet.—The feet of the aged require constant care and supervision. Corns, callosities, and neglected toe-nails are causes of discomfort and suffering amounting, in some cases, to helplessness. The appointment of a professional chiropodist, assisted by a pensioner selected from each company, has been a real boon. Light, well-fitting, and, when necessary, specially made boots are desirable for the comfort of old people. A hard, heavy, unsympathetic boot will often completely cripple an old man, even when his feet exhibit no particular deformity.

Comforts and Privileges.

It is our practice to recommend the issue of flannel abdominal belts and chest protectors to old men who have been long accustomed to wear them. We do not discuss their value from a medical point of view or the real necessity for them, but we know that they make these old men happier. The garments doubtless create a feeling of warmth and comfort, and give a measure of confidence to the wearer. Inpensioners who require trusses are always specially measured and fitted, to secure comfort in wearing the truss without undue pressure on atrophic skin. In the infirmary we allow the permanent hospital patients to smoke in bed, and their desires for small luxuries are humoured as far as possible. We do not classify the routine issue of spirits as a luxury, but we use alcohol freely when medicinally necessary. Alcohol is, we believe, an essential stimulant in the treatment of broncho-pneumonia. The temporary withdrawal of small privileges is an important therapeutic agent. Incontinence, with no organic basis to explain it, is cured with astonishing frequency by withholding for a day one of the minor privileges, pipe or beer. The man associates the want of his pipe with the necessity for not soiling himself.

The Commissioners of the Royal Hospital arrange for weekly drives in motor char-a-bancs for the infirmary patients, and the change does much to prevent the self-centred abstraction so common among the aged. We often find that a change of ward, involving new surroundings and new companionship, has a similar beneficial effect.

Diagnosis.

A brief reference should be made to the difficulties that may arise in connexion with the protean manifestations of uræmia in the aged. Another condition which must be remembered is myxœdema; a man, aged 74, whose general condition suggested chronic parenchymatous nephritis, has been almost rejuvenated by the administration of thyroid. In this connexion we have noted two cases of acute general eczematous dermatitis which have cleared up under small doses of thyroid extract. The occurrence of thyroid insufficiency does not appear to be particularly frequent in the old; at any rate, we see no reason to believe that hypothyroidism is the cause of old age, or that the administration of thyroid extract is the panacea that some writers rather enthusiastically suggest.

Summary and Conclusion.

There are few conditions more difficult to define than old age. The term "senescence," implying physical deterioration only, conveys to us the meaning of physiological and normal old age, a condition but little complicated by social or medical problems. We use the term "senility" for morbid old age—the condition, a burden to the individual and his friends, which is evidenced by physical deterioration plus lowered mentality.

The problems connected with old age are chiefly due to this lowered mentality of the senile. The independent individual, whatever his age, is not out of harmony with his surroundings. It is the man who has lost his elementary stimuli—self-reliance, the instinct of self-preservation, and self-respect—who creates a social discord. These stimuli are often allowed to lapse prematurely and without adequate cause, with the result that much unnecessary invalidism burdens the patients' homes and the State. We interpret the "lowered mentality" in our senility equation in terms of loss of balance between

the sympathetic and the para-sympathetic nervous system. Subtle psychic changes and lapse of sympathetic control, in our view, go hand in hand and finally culminate in senile dementia. Hysteria is unexpectedly common among the aged. Auto-suggestion and pessimistic hetero-suggestion have a most demoralising effect upon the senescent. The senescent should be kept away from the suggestive atmosphere of hospital surroundings, unless they suffer from conditions which call for nursing and constant medical supervision. Old men should not be nursed in the same ward with considerably younger men, suffering from hemiplegia, advanced tabes, &c. Suicide is apt to be infectious in an institution for the aged, and men who attempt suicide should be transferred to an institution where the care of mental cases is undertaken.

The attitude of all concerned with the treatment of the senescent in hospital should be one of cheery optimism. A Mutiny veteran, aged 89, with broncho-pneumonia, who stated on admission: "This time I'm booked for the Other World," was much amused when told that "the return half of his ticket was sticking out of his pocket," and made an excellent recovery. Badinage, and cheery chaff, if unofficial tonics, are wonderfully effective. Cases of broncho-pneumonia in the aged, if kept in bed, are—we believe—almost invariably fatal. An old man can very seldom be kept *comfortably* propped up in bed. We have had startling recoveries in men who have been put into armchairs every day; as a further instance of suggestion, we find that the patient's trousers are of the greatest therapeutic value: he regards his own condition far less seriously when he is clothed than when he is swathed in blankets. We urge the value of encouraging the "will to live" when the senescent are curable patients in hospital, but we strongly advocate the use of morphia when discomfort and pain become the dominating features in incurable diseases.

Table of Deaths.

During the two years, August 1st, 1919, to July 31st, 1921, there were 169 deaths among the in-pensioners. The average age at death was 77·2 years. The cause of death in the attached table is shown under the outstanding clinical and post-mortem findings, but in the majority of cases more than one system (circulatory, respiratory, excretory, &c.) had degenerated or were actively diseased.

Cause of death.	Number.	% of total.
Circulatory system (including cerebral hæmorrhage, 4; arterio-sclerosis; aneurysm; V.D.H.; myocardial degeneration; suppurative myocarditis with rupture into pericardium, 1)	64	38
Respiratory system (pneumonia, broncho-pneumonia)	41	23
Renal disease (uræmia, &c.)	12	7
Malignant disease	22	13
Senile gangrene (associated with glycosuria, 3)	4	—
Chronic pachymeningitis (senile dementia, tabes, 1)	11	7
Accidents (knocked down in street, &c.)	4	—
Septicæmia	1	—
Tuberculous disease (lungs, 2; larynx, 1)	3	—
Cirrhosis of liver	1	—
Suicide (by hanging)	1	—
Post mortem (shock and pneumonia)	1	—
Gastric ulcer (with hæmorrhage, patient aged 71)	1	—
Chronic pancreatitis (with cholangitis)	1	—
Result of old wound	2	—
Total	169	

Of the 22 "malignant diseases," the primary sites were as follows: Side of head, 1; tongue, 2; floor of mouth, 1; rodent ulcer (septic pneumonia), 1; pancreas, 2; gall-bladder and ducts, 5; stomach, 2; pylorus, 2; colon, 5. One case with carcinoma of descending colon died of general peritonitis due to rupture of stercoral ulcer in cæcum.

THE ROYAL BATH HOSPITAL, HARROGATE.

ON April 21st the new bath-house and cooling-room of the Royal Bath Hospital at Harrogate were informally opened. The company included the Mayor of Harrogate (Alderman W. Raworth) and members of the corporation; Mr. C. A. Rhodes, chairman of the hospital; and members of the honorary medical staff, which is constituted as follows: two consulting physicians, six physicians, one surgeon, one ophthalmologist, one oto-rhino-laryngologist, two clinical pathologists, two radiologists, and three dental surgeons. The Royal Hospital is not a local organisation; since its establishment in 1824 patients have been drawn from all parts of the kingdom. There is accommodation for 150 patients, and last year more than 1500 men and women received treatment. There was a loss of £300 on last year's working expenses, and of £1200 on those of the previous year. The modernisation of the institution, so far as money will allow, now advances it to the front rank of hospitals of its kind.

THE ROLL OF THE FELLOWS OF THE ROYAL COLLEGE OF SURGEONS OF ENGLAND.[1]

BY VICTOR G. PLARR, M.A. OXF.,
LIBRARIAN OF THE COLLEGE.

THAT great surgeons would have been men of supreme talent in any walk of life is scarcely disputable, but that the rank and file of highly-qualified surgery is capable outside its particular province of remarkable versatility is not so apparent. This paper is practically a report on a compilation drawn from a variety of sources, which has occupied me during a number of years; the compilation in question is a biographical dictionary of all the Fellows of the College who have died since the institution of the Fellowship in December, 1843. The number of biographies, of which a large minority are lengthy, is considerably over 2000, and from most of them it would appear that the older surgeons played many parts—as social reformers in remote and ill-drained towns and waterless villages in the earlier part of the last century, as soldiers, builders of Empire, inventors, artists, linguists, travellers, and men of science and letters. Among the most interesting of those whose biographies have been written should be numbered such as followed their proper vocation in attendance on famous men.

Nelson's Surgeon.

Thus Lambton Este, one of the 242 elected Fellows of the year 1844, was Nelson's surgeon and intimate friend. Este qualified as M.D. of Pavia as long ago as 1798, and joined Nelson's *Victory* in November, 1801. "In my first interview with Nelson," wrote Este, "he complained of frequent pains in his right side, from former injuries—that many warnings and inabilities made him conscious of his shattered frame, and anxious for repose. The sight of his remaining eye was fast failing him; a thick opaque membrane had grown over and into a part of the transparent cornea, and, as far as it extended, was an obstacle to vision in the only eye left him." It thus appears that Nelson was a sick man at the time of his death. Este was not present at Trafalgar, having been sent home with despatches, an errand on which he had been often employed. A fine old example of a bygone type of surgeon, he died as lately as January, 1861.

Fellows at St. Helena and Waterloo.

James Roche Verling, also a Fellow, sailed to St. Helena with Napoleon, whom probably he knew well, as among his accomplishments were a perfect knowledge of French and Spanish. He attended for many months at Longwood House, but was never called in by the Emperor, who seems to have seen in him a nominee of Sir Hudson Lowe. Montholon's suggestion that he should attend the Emperor and write bulletins more unfavourable than the truth required was very honourably refused by Verling. John Gunning, born as long ago as 1773, one of the original 300 Fellows of Dec. 11th, 1843, was suddenly called upon at Waterloo to amputate Lord Raglan's arm. This he did, apparently in the open field, and Lord Raglan, who bore the unanæsthetised operation in silence, then shouted, "Hulio, don't carry away that arm till I have taken off my ring!"

Distinctions in Peace and War.

Surgical inventors range from Lister to Rawlings Beaumont, who originated the idea of the sewing-machine, and James Syme, who was before Macintosh in the invention of water-proofing. Did space permit one might do much more than cite the noble army of those who have died at their posts whether as military or civil surgeons. Of military surgeons 22 Fellows have died in the late war, either on the field or of ill-health contracted during their service. They figure in the Roll of Honour of the Royal College of Surgeons, and their biographies are now put on record among their numerous interesting and deserving confrères. That there have been many eminent Members, who never proceeded to the Fellowship, is, of course, obvious, and that many great surgeons flourished before 1843 none will deny. But to discover and do justice to these would make what has been a very laborious task for one man a labour for a historical Hercules.

THE COUNTY OF LONDON BRANCH, B.R.C.S.

THE report of the County of London Branch of the British Red Cross Society dealing with the years 1914 to 1919, and including the year 1920, opens with a foreword by Mr. J. F. Badeley, President of the branch and chairman of the County Committee. Writing as one who was closely in touch

[1] Based upon an address given on April 19th at a meeting of the Section of History of Medicine of the Royal Society of Medicine.

with Red Cross work in London throughout the war, Mr. Badeley expresses the hope that the Red Cross organisation may once and for all be put upon an official basis which, in the event of another war, will entitle it from the outset to a larger measure of official support than that which was forthcoming in the early stages of the recent war.

The report covers 208 pages, and contains exhaustive information concerning the great work done during and after the war by the largest branch of the Red Cross Society in the Kingdom. The branch was inaugurated in 1909, the first chairman of committee being the late Dr. F. M. Sandwith, who rendered very valuable service until he retired in 1915 on receiving an appointment as consulting physician with the Mediterranean Forces. In 1913 there were 55 Red Cross detachments in the County of London, with a total membership of 1538. In 1919 there were 160 detachments, with a total membership of 12,678. Of the 113 auxiliary hospitals in the County of London 31 were branch hospitals. The rapid organisation of work in connexion with Belgian refugees was a feature of the earliest activities of the branch during the war. The supply of enormous quantities of stores by the work parties, and the ambulance services rendered on air-raid duty—to which testimony is borne by the Chief Commissioner of Police and by the London County Council—were other outstanding forms of work accomplished. The report for 1920 contains particular references to the provision of orthopædic clinics for ex-soldiers, to the work of the department in charge of wounded soldiers' drives and recreation, and to the work for invalid children.

THE PREVENTION OF STREET ACCIDENTS.

THE traffic peril to pedestrians in the streets of London, and the inadequacy of the ambulance service available in this connexion, were discussed at a recent meeting of the London "Safety First" Council, held at the Middlesex Guildhall. The Council considered a recommendation of their street "safety" committee, based on a report drawn up by Dr. F. J. Waldo, coroner for the City of London and Southwark. In this report Dr. Waldo explained the Southwark system of safety crossings for foot passengers, initiated by himself and Mr. A. Harrison, surveyor for Southwark. The system entails the establishment of sign-boards inscribed with the words "Cross the Road Here" on lamp posts on each side of tram-lined roads, at places where police constables are on fixed point duty. The constable stops the traffic, and conducts children and elderly, nervous, or disabled persons across the roadway. Such "safety" crossings have so far, during the past few months, been provided for in all the main roadways in Dr. Waldo's jurisdiction in Southwark—i.e., in the Old and New Kent-roads, Walworth-road, and the Blackfriars and Westminster Bridge-roads.

Dr. Waldo's interest in the matter is the result of his experience as a coroner, to which we referred in our issue of April 22nd. He claims that the system in the City is better than that in force in the metropolitan area. In the City, not only have the police knowledge of first aid, but, by means of street ambulance boxes, they are able to get in touch immediately with the nearest ambulance. In the City's one square mile there are two ambulance stations, while for the 117 square miles of the metropolitan area there are only six stations with eight ambulances.

A resolution, put to the meeting in the following terms, was carried unanimously: "That each of the local authorities in the County of London and the extra-metropolitan area be invited, in consultation with the police authorities, to bring into operation a scheme similar to that adopted in the Borough of Southwark."

THE HOUSING SHORTAGE.

IN an intermediate issue, dated April 13th, of the *Fortnightly Record* of the Housing and Town Planning Council, a strong protest is made against the view that the country is within reasonable distance of the time when private enterprise will let houses at rents which the average working-class family can afford to pay. No private investor, it is pointed out, has any illusions on the subject. Even if the cost of a house (including the cost of building, of roads, of land, and all other charges) does not exceed £450, such an investor cannot, after paying the present high rates of interest, providing an adequate sinking fund, and meeting the cost of repairs, let this house at a rent of less than £1 per week, to which must be added rates on a high assessment. Had wages remained at the relatively high standards ruling in 1919 and 1920, there might have been some prospect of securing such rents. But the process of wage reduction has already gone so far as to render it practically certain that private enterprise will be powerless to meet the housing needs of working-class families, many of which are now living under economic conditions worse than those they endured before the war.

The energy of speculative house builders will for some years to come be absorbed in meeting the lower middle-class demand for cottage villas which can be run with a minimum of domestic service; provided the price asked is an uninflated one, say from £600 to £700, quite 100,000 cottage villas could, very probably, if built, be readily sold within the next five years. The speculative builder is a man of slender resources, and he must build to sell. Scores of thousands of families of professional men and others with a limited income are greatly in need of accommodation of a kind which he can provide. These families can secure the necessary capital. But as regards working-class families the clear issue, therefore, is between, on one hand, the continuance of the present policy of coöperation between the State and local authorities in the building of houses and letting them to those whose housing needs are the greatest (more especially ex-Service men and large families) and, on the other hand, the placing of reliance on the force of private enterprise, which has already lamentably failed.

MEDICAL CONFERENCE AT A TOBACCO EXHIBITION.

IN connexion with the Fifth International Tobacco Trade Exhibition, to be held at the Northampton Institute, Clerkenwell, London, E.C., from May 8th–13th, it is proposed to hold a brief medical conference in the lecture theatre of the Institute on Wednesday, May 10th, at 5 P.M. The exhibition is being organised by *Tobacco*, the organ of the British and Colonial Tobacco Trade, and its editor, Mr. E. S. Caton, would be glad to hear from medical specialists willing to give 10-minutes addresses on the action of tobacco on the nervous, circulatory, and respiratory systems, and its special action, if any, in the case of women. The subject is one on which the public is very ready to be enlightened. Offers should be made to Mr. Caton at Monument Station Buildings, London, E.C. 4.

PARTURITION CHAIRS.

AT a recent meeting of the West Kent Medico-Chirurgical Society Mr. C. J. S. Thompson, Curator of the Wellcome Historical Museum, pointed out that the earliest use of parturition chairs was at Luxor. The early patterns were apparently very simple, the chair having a horse-shoe piece cut out of it; later hand-grips were added, then foot-rests, and in some chairs leather upholstery was put on the seat and back. In Cyprus the chair was made from a solid block with two cavities. In the seventeenth century chairs were in use in Germany, and they are used in Turkey and Egypt at the present time. A box chair is in use in Japan. The lecturer remarked that although the chairs were mentioned by Smellie and Ben Jonson, he had not been able to find an example of one and would be grateful for any help in this matter.

COLONIAL HEALTH REPORTS.

Bahamas.—**In his annual report the Colonial Secretary states that the public health of the colony was better in 1920 than in 1919. There was the usual summer epidemic of typhoid in New Providence, but the mortality was not high. The Out Islands were less fortunate in respect of that disease, but the colony escaped the influenza epidemic. The estimated population in 1920 was 57,838; the birth-rate was 34·4 and the death-rate 21·6 per 1000.**

St. Vincent.—**The birth-rate per 1000 of the estimated population in 1920 was 36·99 and the death-rate 18·66. Illegitimate births numbered 1401, or 70·1 per cent. of the total of all births. The administrator (Mr. R. Popham Lobb) in his report claims that St. Vincent is the healthiest of all the West Indian islands. The mean monthly temperature for 1920 was 79° F. The rainfall at Kingstown Experimental Station, 80 feet above sea-level, was 85·51 inches.**

THE new address of the Medical Research Council is 15, York Buildings, Adelphi, London, W.C. 2. Telephone number still Gerrard 6449.

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